FOOD MANUFACTURE

Incorporating Food Industries Weekly

ONARD HILL LIMITED, 17, STRATFORD PLACE, LONDON, W.1 — SEPTEMBER 1, 194

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SUNVIC

TAS/SC 132

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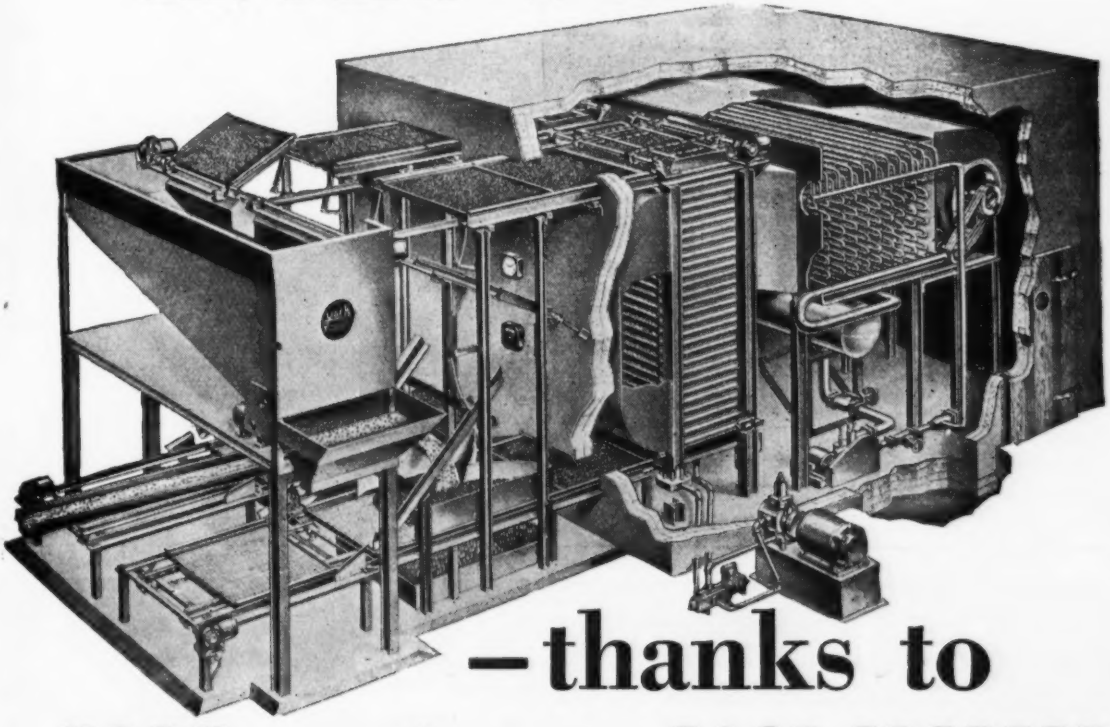

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York refrigeration air conditioning

HEADQUARTERS FOR MECHANICAL COOLING

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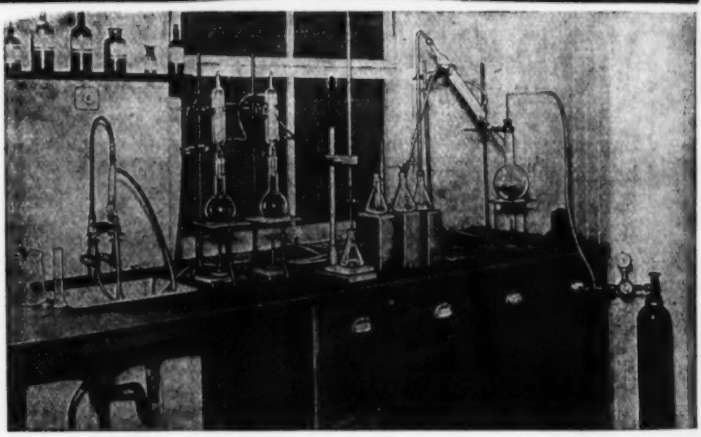

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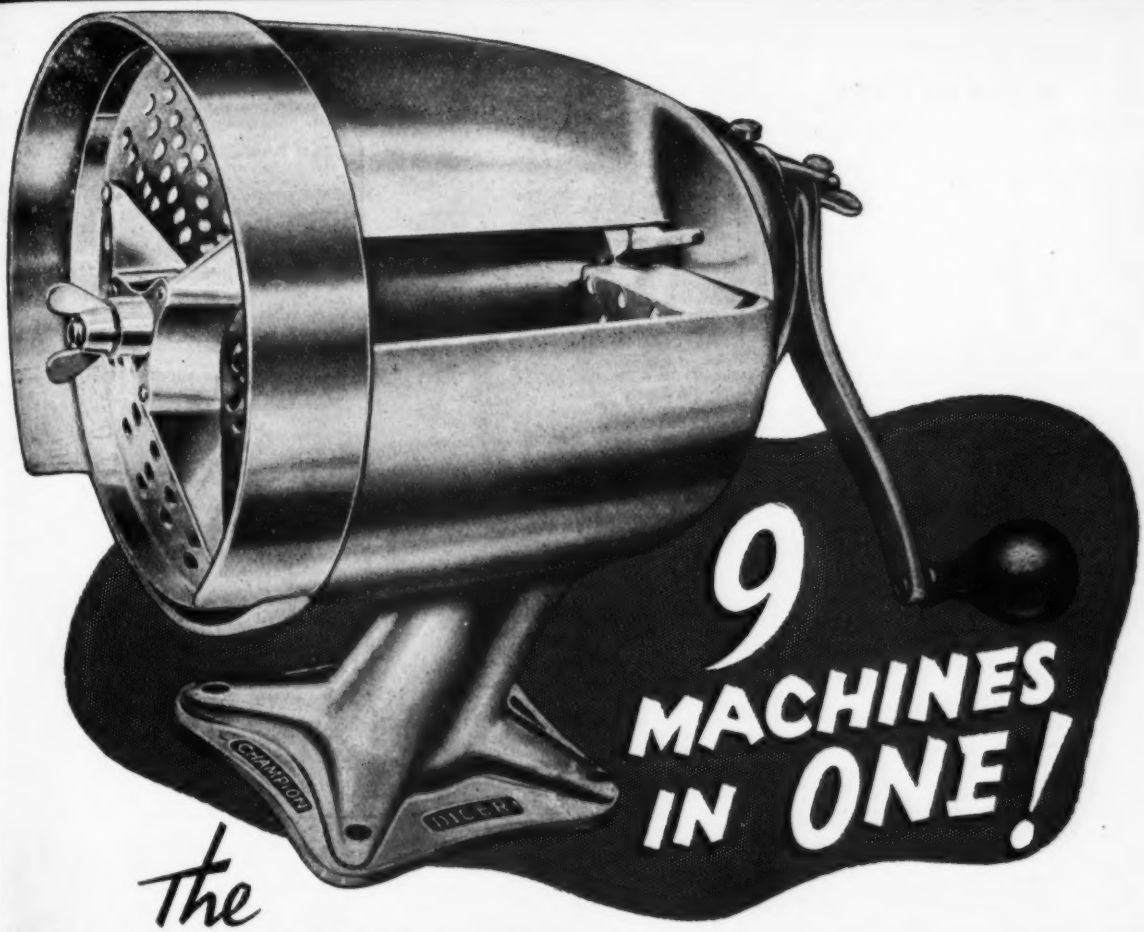

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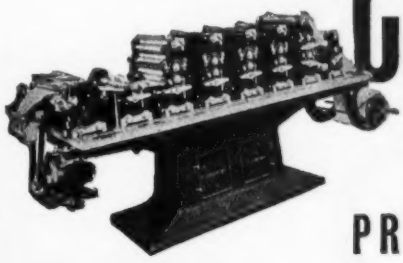

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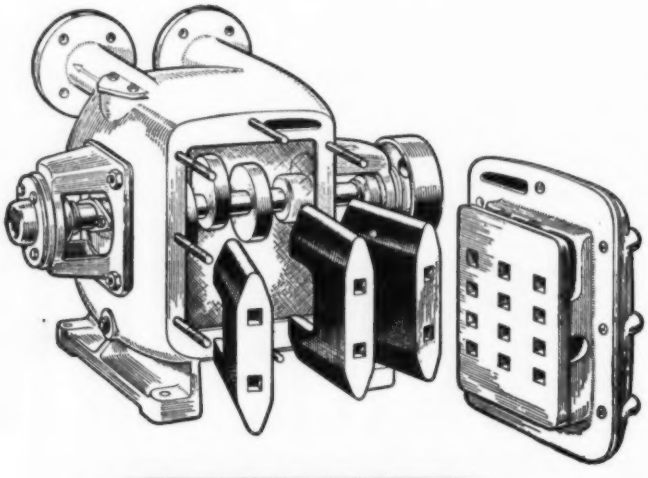

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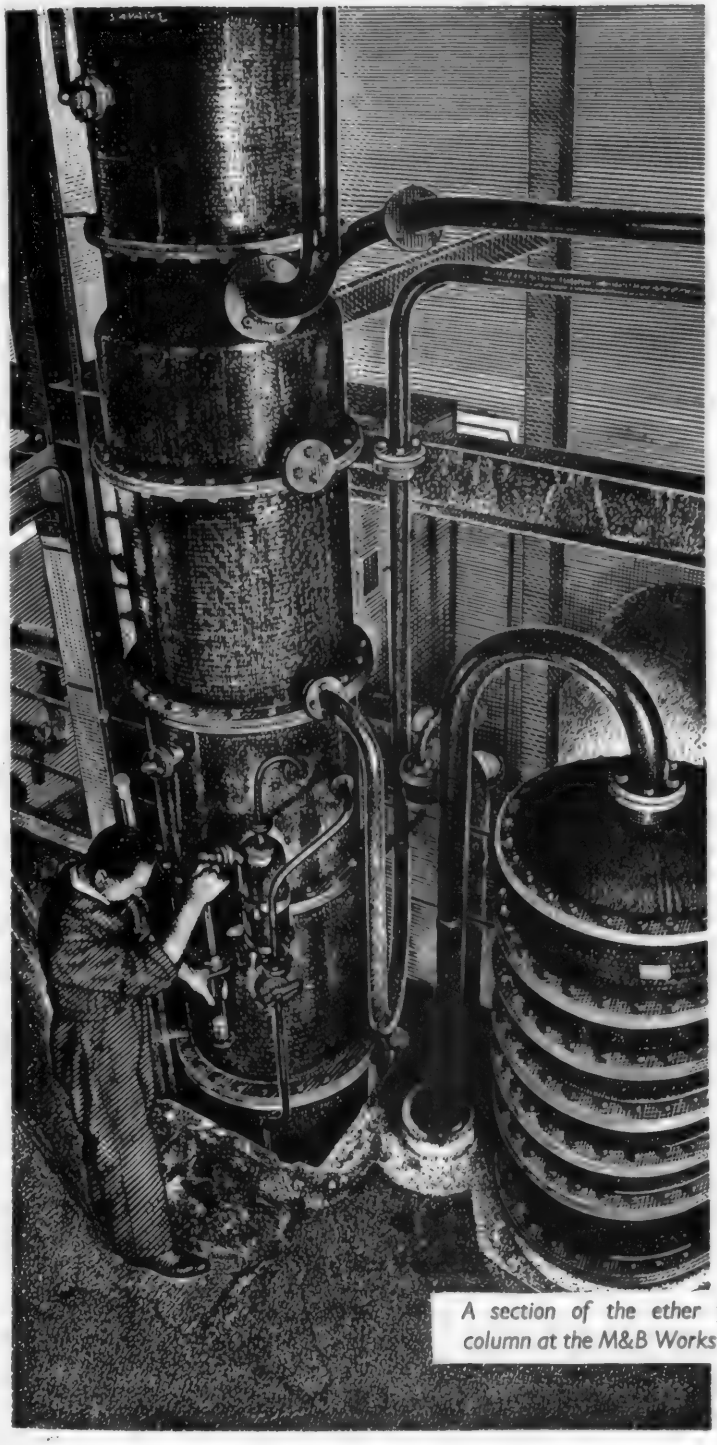

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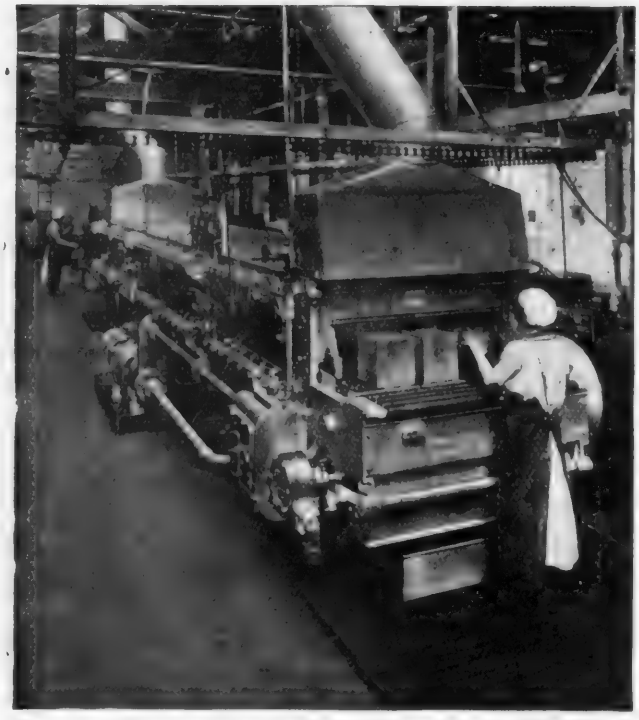

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" " " " Slough
etc., etc.

Made in various types and sizes according to class of container to be handled and output required.

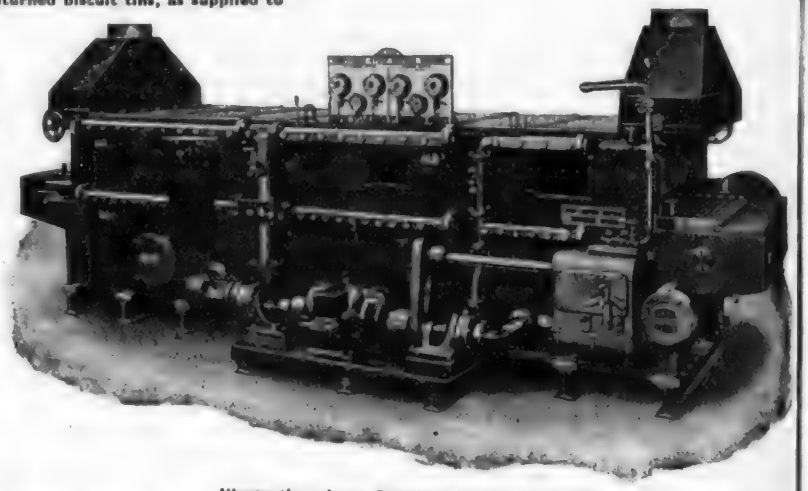

Illustration shows Standard Model, Type 18JJ
Specially adapted for washing and thoroughly cleansing the dirtiest class of returned jam jars, as well as new glass and stone jars. The machine illustrated has an output of 230 gross of 2-lb. dirty return jars per day.

SEND FOR FULL PARTICULARS

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Chemically, TEEPOL is based on sodium higher alkyl sulphates and is marketed as a clear amber-coloured liquid. TEEPOL is soluble in water of any degree of hardness to give clear neutral solutions which do not hydrolyse and are stable over a wide range of pH values.

TEEPOL is effective, even at very low concentrations, in acid, alkaline or neutral solutions. The calcium and magnesium salts of TEEPOL are themselves readily soluble in water and consequently solutions of TEEPOL are no less satisfactory in hard than in soft water. TEEPOL is now being made on a large scale in this country and supplies are free and unrestricted.

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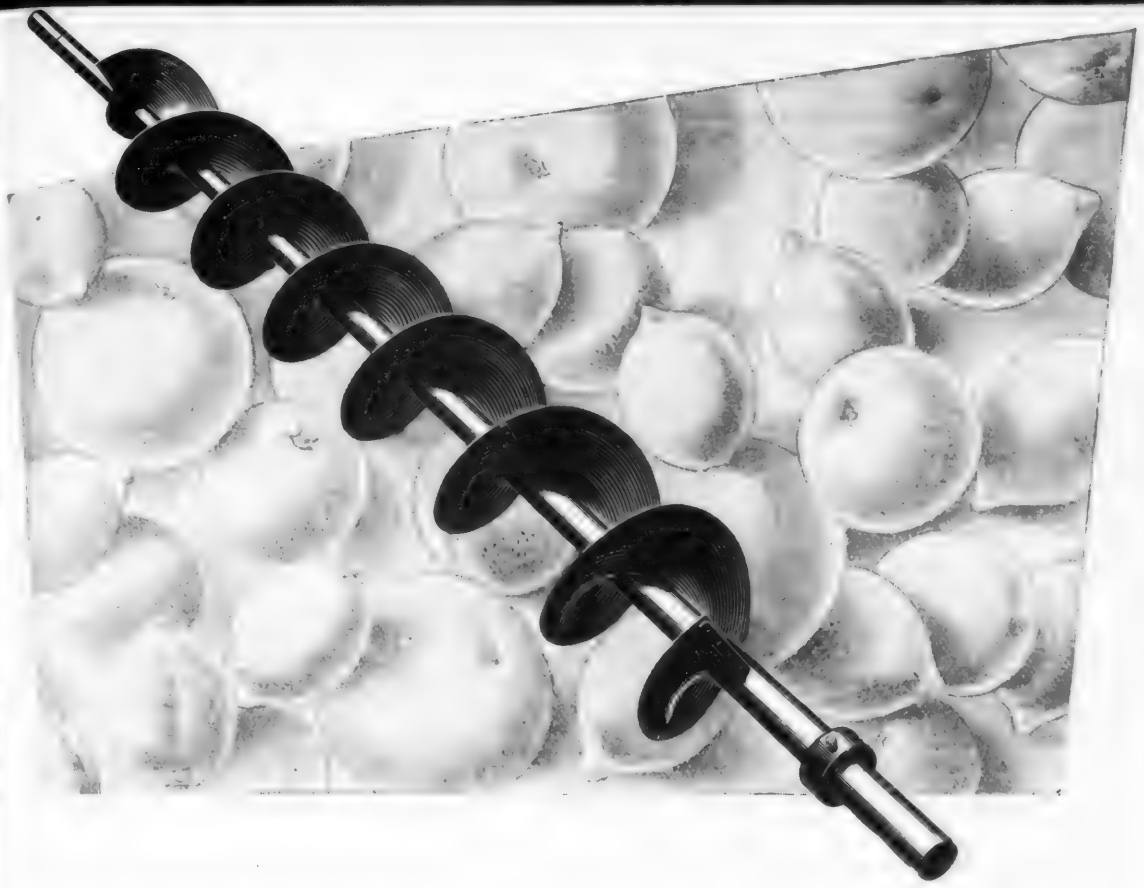

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HERACLEUM . . .

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The time is not yet here when we can supply *everyone* with *all* their needs. Fuel cuts and raw material shortages will continue to curtail deliveries, *so make the most of available supplies.* Within current limitations we do our best and will continue to allocate production fairly among our many customers. In the meantime we urge all users to speed up the recovery of returnable containers.

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Protect the flavour and appearance of your product and deliver in glass. *The* economical method of delivery.

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U.G.B. Beer and Mineral series spell accurate capacity, long life and maximum trippage.

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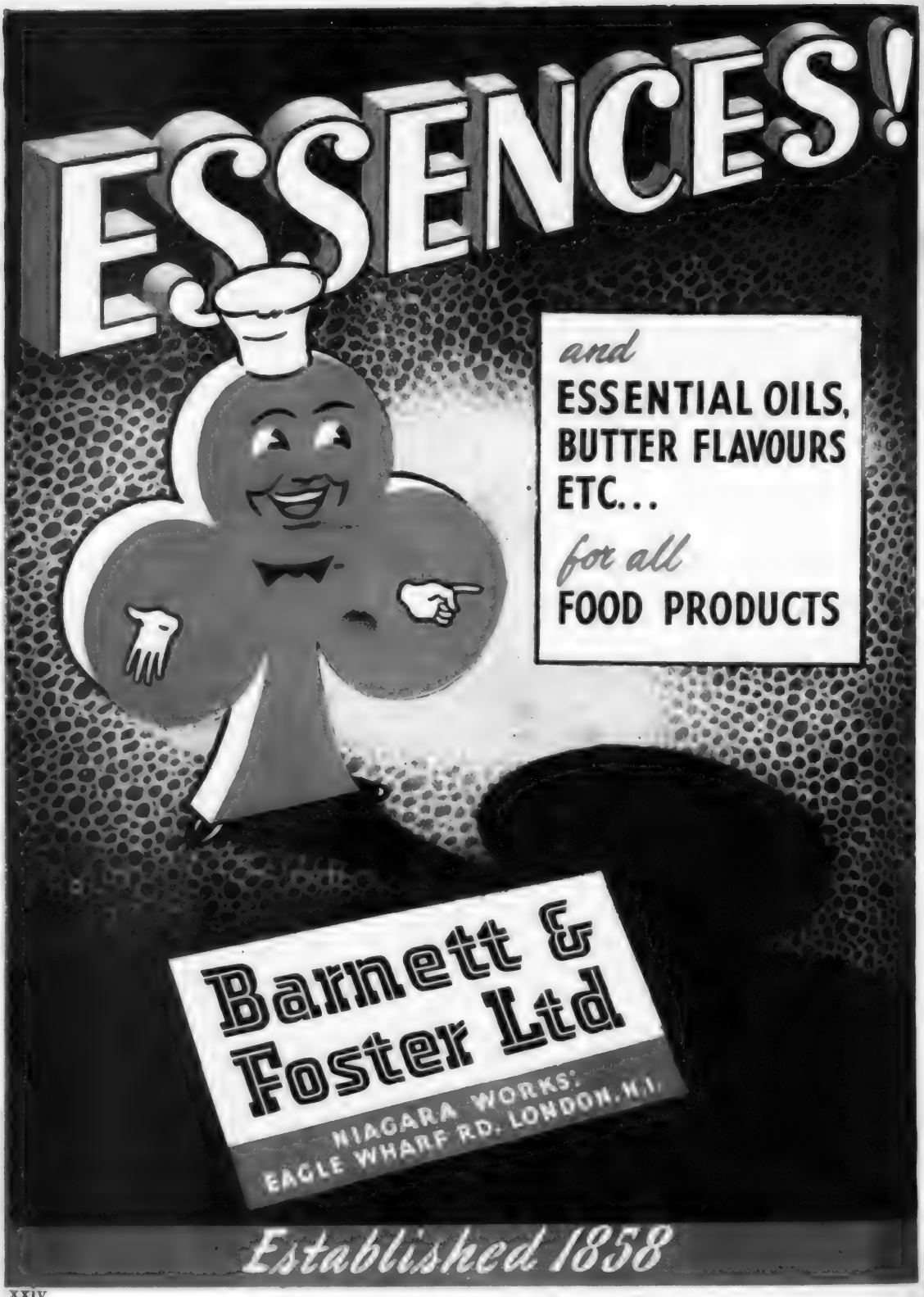
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IRRESPECTIVE of the efficiency of the productive organisation which it served, this Railway Siding was itself the cause of losses. High *operating costs per ton*, and wear and tear on tracks and rolling stock involving heavy expenditure on replacements, were the results of neglect.

A Railway Siding fulfils a very important function ; through it flow raw materials, and finished or partly finished goods according to the character of the organisation. The planning of the original layout, the selection of specification and the subsequent installation and maintenance should receive attention comparable with that bestowed upon problems affecting the layout of the whole Works and Stores to which the Siding must be closely related.

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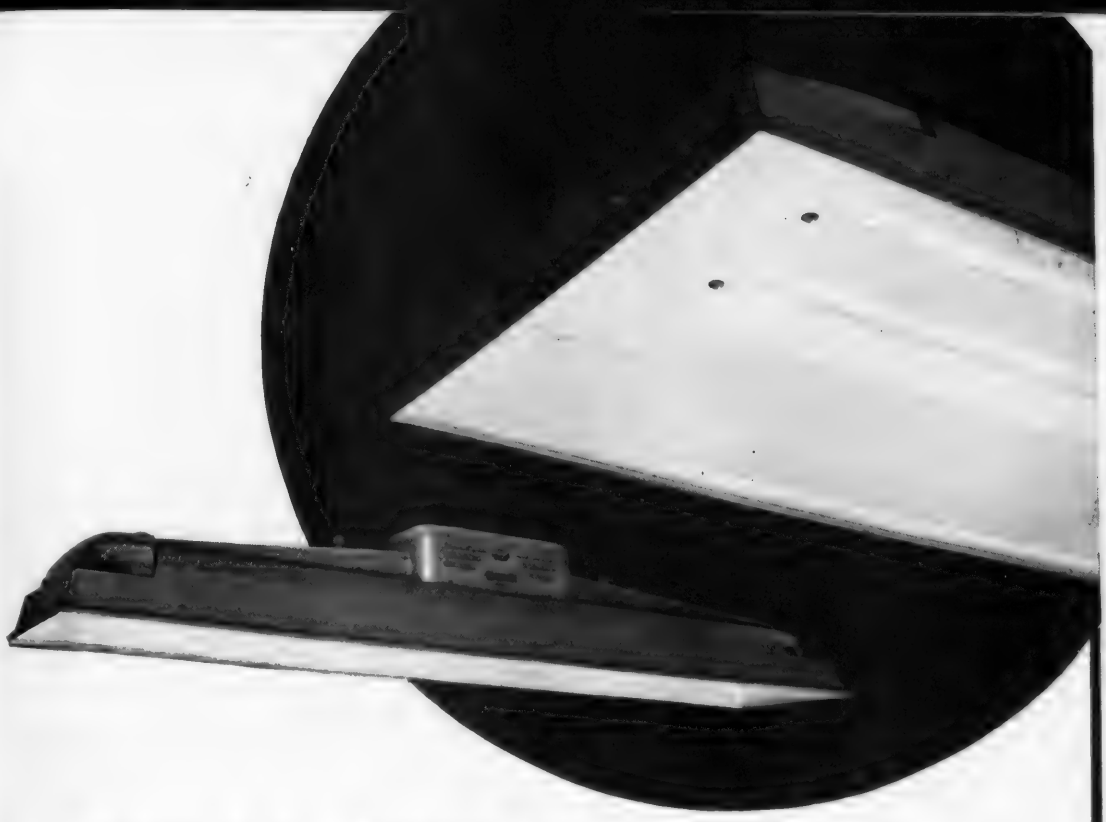

Porcelain Enamel

Crysteel Porcelain Enamel is used for the reflectors of Fluroliers Type "A" and "B." This ensures a white smooth surface which does not deteriorate, is easy to clean and reflects a high percentage of the light without too much specular reflection so as to avoid glare. The enamel while retaining the true shape of the reflector protects the metal and provides an ideal reflecting surface for the purpose.

Type A - 2 x 80 watt.
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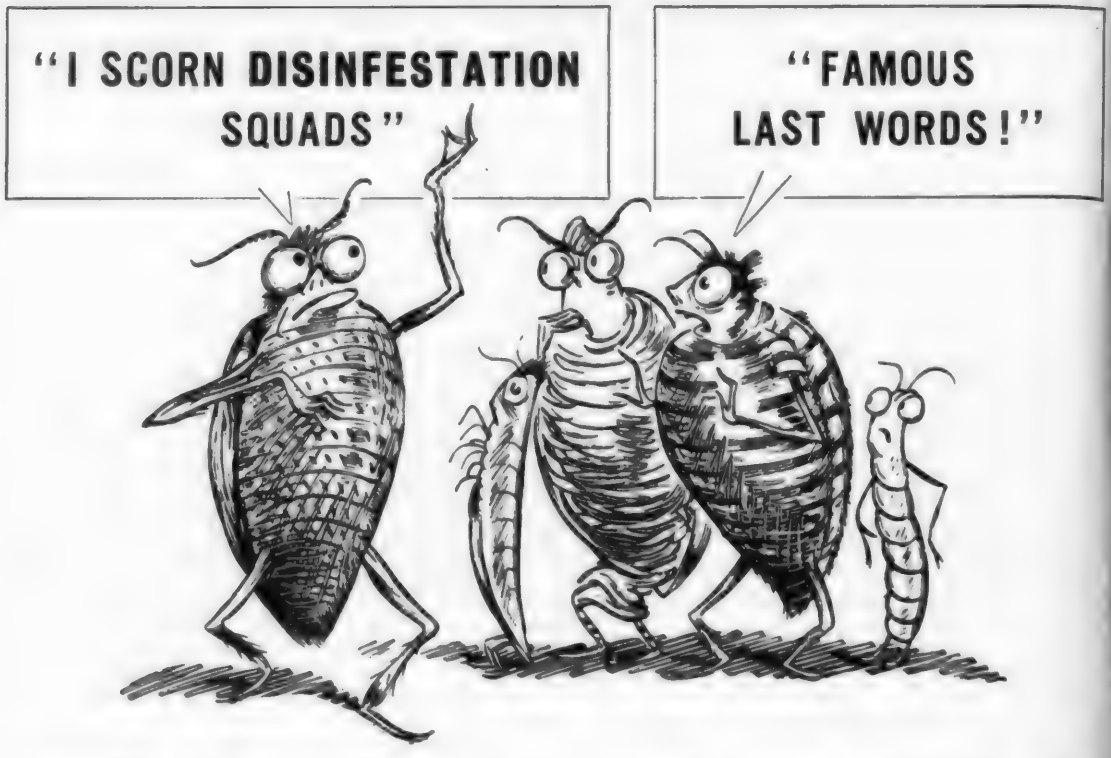
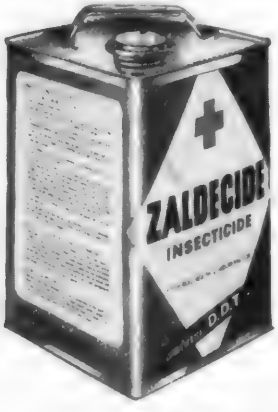


ZALDECIDE/D.D.T. QUICKLY KILLS COCKROACHES, FLIES, SILVERFISH, BUGS, CRICKETS, AND OTHER INSECTS. ZALDECIDE is made in powder and fluid form so you can use either or both according to circumstances. The liquid is for spraying infested premises and the powder for use in food stores and places where spraying is inconvenient. Not only does ZALDECIDE destroy insects—it prevents re-infestation. If you have any infestation problems write to Newton, Chambers & Co. Limited, Thorncliffe, Sheffield.



← ZALDECIDE FLUID

Triple action—quick paralysis of insect—penetrating vapour action—persistent contact action. Leaves an invisible film fatal to insects adhering to treated surfaces.
From 12/9 per gallon according to size of container, or in quart tins 4/- each.

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For use in kitchens and food stores, where liquid insecticides might contaminate foods. Coloured to make it easily recognisable. 30/- per case of 6 tins, each tin containing approximately 6 lbs. 8 ozs. Tins not sold separately.

ZALDECIDE / D.D.T.

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SPIRAX corner

Dear H.D.
This photo of handbell ringing has the germ of an idea for our next advert.
It is this: if you know how to use handbells you can make them give you a very nice tune. If you don't know how to use them the most you can make is a ~~bit of a~~ noise without getting anywhere at all.
Steam trapping is like that. If you buy just "steam traps" without knowing how to use them properly you will get nowhere at all - and very quickly. But if you know how to use steam traps - if you understand good steam trapping practice - you will save much steam and will improve your plant output.
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SPIRAX STEAM TRAPPING AND AIR VENTING

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Please reserve one copy of the new Spirax Technical Bulletin No. 16 on "STEAM ECONOMY" and post to this address as soon as available.

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IMPORTANT ANNOUNCEMENT

To all users of GUM TRAGACANTH

YOUR INDIVIDUAL REQUIREMENTS ARE PROVIDED FOR BY RED CARNATION BRAND POWDERED GUM TRAGACANTH, WHICH IS NOW AVAILABLE IN FOUR STANDARDISED GRADES, OF CERTIFIED QUALITY AND CHARACTERISTICS.

● GROUND by a special process to ensure controlled tenuity.
● VISCOSITY established under expert supervision.
● TESTED at every stage of processing.
● GRADED to a series of predetermined standards.
● PACKED in airtight tins
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POWDERED
GUM TRAGACANTH
(B.P.)
GRADE BX
KIMPTON BROS. LTD.

GUM TRAGACANTH is an essential ingredient in many industrial and pharmaceutical formulæ. Being a natural product, with natural imperfections and variations, its commercial applications have, in the past, been attended by problems arising whenever the characteristics of an ingredient are not stable. Now—these problems have been solved by the marketing of RED CARNATION Brand Gum Tragacanth. Whenever you order RED CARNATION Brand Gum Tragacanth, and whatever Grade you order, you know what you will be receiving—Gum Tragacanth in a stabilised form as regards viscosity, colour and fineness of powder. In addition, you are certain that the Gum Tragacanth you receive is fresh, as the large turnover of RED CARNATION Brand obviates the risk of the Gum in stock deteriorating through long storage.

GRADES			
1	2	3	4
BXXX	BXX	BX	BA

● If you have any queries regarding RED CARNATION Brand Gum Tragacanth—*e.g.* which Grade is most suitable to your requirements—our Research Department will be pleased to advise you.

The literature dealing with Gum Tragacanth is not readily accessible to the average commercial user. On request, you can obtain a free, 12-pp. illustrated booklet, telling "The Story of Gum Tragacanth."

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Powdered Gum Tragacanth

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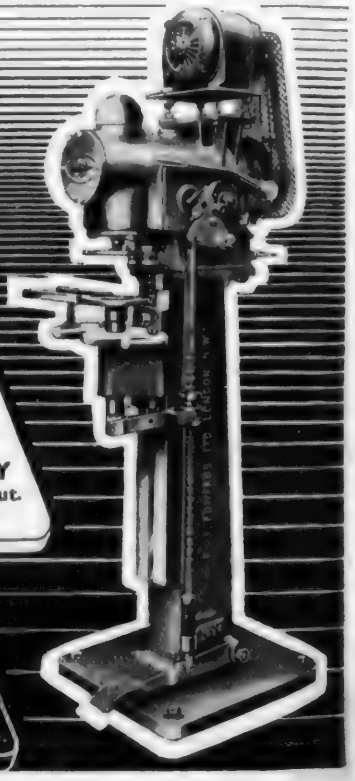

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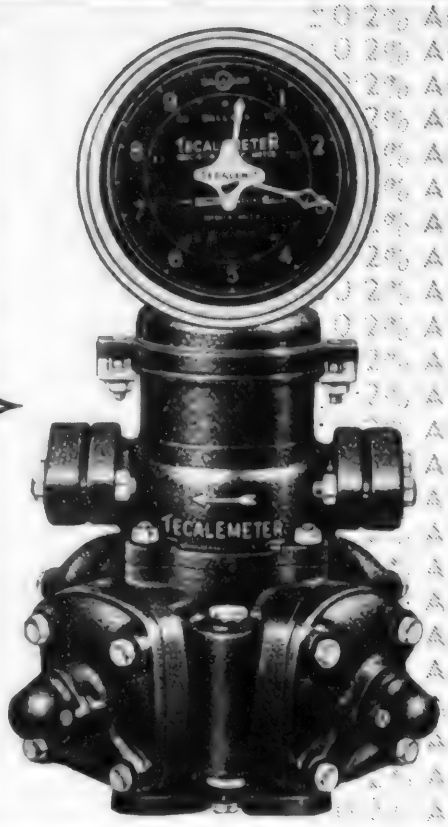

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TAS AL 214

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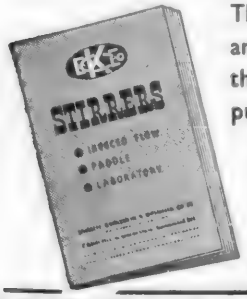
FROM ALL MIXING TROUBLES..

Here is a new type of coupling for Kestner Portable Electric Stirrers and Mixers. A quick action chuck that allows the release of the shaft by one turn of the wrist—no spanner is necessary! When replaced, however, it is rigid and self-locking.



This is only one of the many new and exclusive Kestner features that are described in our recent publication—Leaflet No. 274.

Have you had a copy?

KESTNER PORTABLE *ELECTRIC* STIRRERS

KESTNERS, *Chemical Engineers,* **5 GROSVENOR GARDENS, LONDON, S.W.1**

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We are frequently asked to build up assemblies such as this, and our skilled technicians will gladly advise for a plan to suit your particular products

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PYREX Brand **Glass Pipe Lines** are made by JAMES A. JOBLING & CO. LTD., **SUNDERLAND.**

Robust! Reliable! Remunerative!

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SUPER 22 ★ SUPER 40

MOBILE

JONES MOBILE CRANES need no gantries, rails or foundations. Being Diesel-driven, they are independent of electricity or coal. Fuel for a hard day's work costs 2 6d. and a driver needs only half-an-hour's tuition. They are invaluable in Works, whether other cranage exists or not, and are built by an organization of many years' experience both as Crane makers and users. **Available for early delivery.**

★ See them on STAND No. 4, Ground Floor, ENGINEERING & MARINE EXHIBITION at OLYMPIA August 28 — September 13

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- Send for fully illustrated leaflet No. 3001 P.W. which gives details of the full range of the Butterfly Brand Sealing Machines.

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POSSESSING A RICH
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TBW 31A7

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A solution of sodium hypochlorite specially prepare for use as a disinfectant.

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CLEARLY *the Best!*

Although wartime conditions necessitate the limitation of designs and sizes we shall see to it that our customers have the best possible service.

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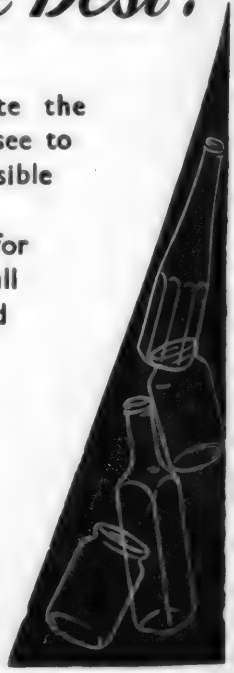

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Dependable Refrigeration

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ONE HORSE OR TWO THOUSAND HORSE POWER ?

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INDUSTRIAL *Portable* VACUUM CLEANERS

These two illustrations reflect the diverse uses of **B.V.C. Industrial Vacuum Cleaners** today. **Your** industry may have a problem remote from these two examples, which can also be solved by our experts. Get in touch with B.V.C. Our long experience on these problems is at your service.

● *Flour Millers, Power Stations, Poultry Breeders, Dairy Farmers, Technical Colleges, Cinemas, and Transport Undertakings are among those receiving satisfactory service from B.V.C. Systems.*

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However carefully food products are prepared the customers' standard of perfection is appearance. The scintillating clarity of metalfiltered fruit juices, syrups, mineral waters, vinegars, etc., is the hallmark of purity.

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THE METAFILTRATION COMPANY, LIMITED, BELGRAVE ROAD, HOUNSLOW, MIDDLESEX

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Proteins **YES**
Vitamins **YES**
High Food Value **YES**.. *these are the constituents of*

YESTAMIN

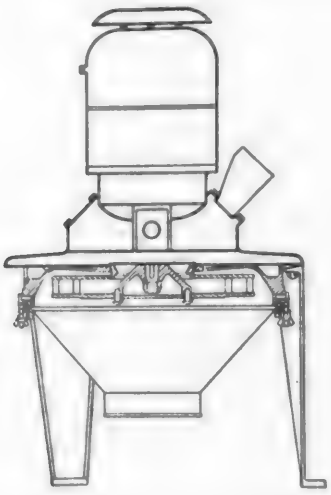
BRAND OF PURE DRIED YEAST

Yestamin is pure, dried, de-bittered Yeast—richest in Vitamins B_1 and B_2—with a 40 per cent. Protein content. It adds greatly to Food Value, and imparts an appetising, piquant flavour that results in increased demand for *your* Processed Foods.

Vitamin B_1	...	2·10 *mgms. per oz.*
Riboflavin (B_2)		1·45 " " "
Niacin	... ...	9·50 " " "

THE ENGLISH GRAINS CO. LTD. BURTON-ON-TRENT

HOW THE ENTOLETER WORKS



The ENTOLETER is the simplest and most unfailing means of continuous infestation destruction on every kind of dry free-flowing material. It is a compact machine about 3 ft. high and 2 ft. in diameter, which is easy to install and economical to operate and maintain. It uses no heat, gas, chemicals or electricity, apart from the current for driving the motor.

The working principle is simple. The material is fed through an inlet spout into the centre of a high speed rotor running in a closed chamber with a hoppered outlet at the bottom. The rotor, which is directly driven by a built-in vertical electric motor, consists of two discs with rings of hardened impactors at the circumference. The material is spun out centrifugally between the discs in a thin spray, and any living organism is instantly killed by severe percussion against the impactors and the walls of the rotor housing.

For continuous pest control install the patent mechanical Entoleter infestation destroyer.

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(Made in England)

Distributed by Henry Simon Limited, Cheadle Heath, Stockport

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Let Magnetic Valves take complete charge of your system of temperature control. They need no watching, no supervision, and, because Magnetic Valves maintain temperature thermostatically, vital fuel is saved as well as valuable man and woman power. The Magnetic Valve Control System has many other applications in industry —for remote control isolation and jettison purposes.

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M.B. 3E

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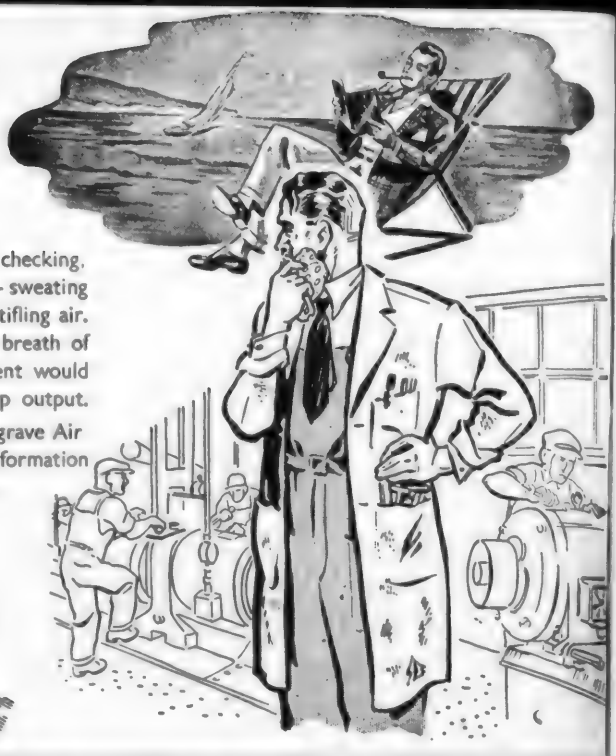
The foreman has had a busy day, walking, talking, checking, advising. His workers have had a tough day too—sweating inside on a hot summer day with bad ventilation and stifling air. A lot he'd give to be "seaside cool"; to have a breath of fresh air. He knows that Air-Conditioning Equipment would solve the problem and help his workers to step-up output.

And he knows too, that what is wanted is Musgrave Air Conditioning Equipment. He intends to pass that information on to his Managing Director at the first opportunity.



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Superpoise

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SALIENT FEATURES

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- ★ Fully floating spiral bevel rear axle.
- ★ Duo-servo brakes in large drums have braking area of over 200 sq. ins.
- ★ Well sprung and amply tyred.
- ★ Very complete equipment.

For long life and trouble-free running, this lively four-cylinder model challenges comparison with anything in its class.

A PRODUCT OF THE ROOTES GROUP

COMMER CARS LTD. LUTON BEDFORDSHIRE

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If Cornucopia is a thing of the past, a walk through the laboratories of Dubuis & Rowsell, overflowing with a large variety of delicious true-to-nature essences and flavours, affords a compensating experience. Nowhere do the subtle flavours of peaches and pineapples, oranges and lemons, grapes and plums, seem more tantalisingly real—all the year round! That is why buyers from all over the world never fail to visit Dubuis & Rowsell. It's a good business experience, too.

Dubuis & Rowsell Limited

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You can't get in chaps— it's a Pearlite box

These are your enemies—the "food-spoilers"—Heat, Cold, Damp, Grease and Odour, the fellows who way'lay and damage your produce on its way to the Consumer. But, powerful as they are, they know when they are foiled. A Pearlite Carton keeps the "food-spoilers" at bay and ensures your produce arriving at its destination in "factory-fresh" condition

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THE TAPER-TO-TAPER THREADS of Crane Fittings, by making solid metal-to-metal contact throughout their entire length, ensure stronger joints free from corrosion.

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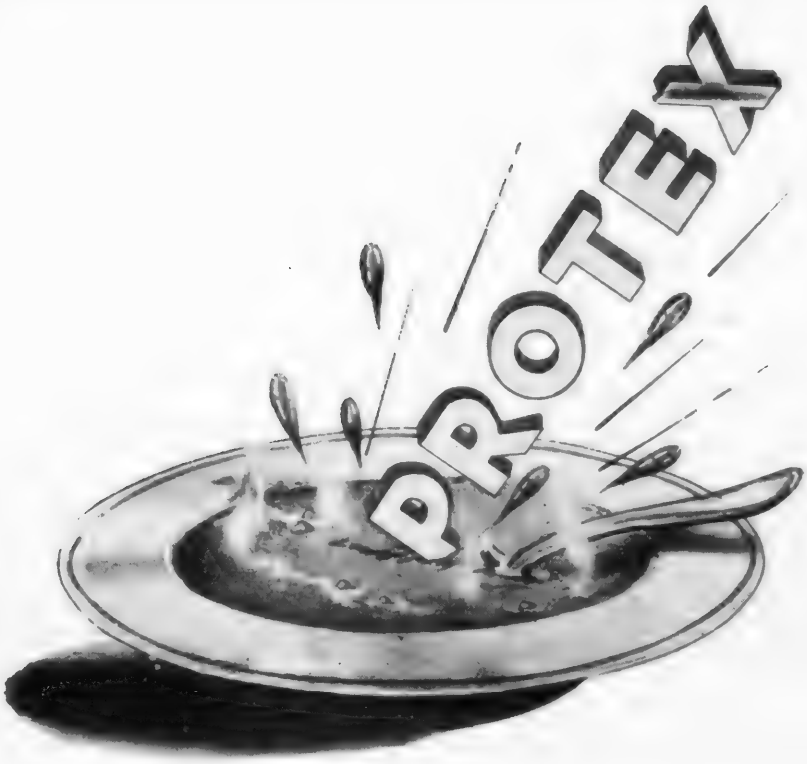

In the soup...

. . . the savoury, the sandwich spread and dozens of products, "PROTEX" adds a delectable flavour that stimulates the appetite and makes Oliver Twists of us all. For "PROTEX" is a concentrated food, full of the valuable amino acids that give zestful taste, aroma and goodness . . . and assists digestion. Many discriminating food manufacturers employ "PROTEX" in their recipes; may we tell *you* more about it?

PROTEX

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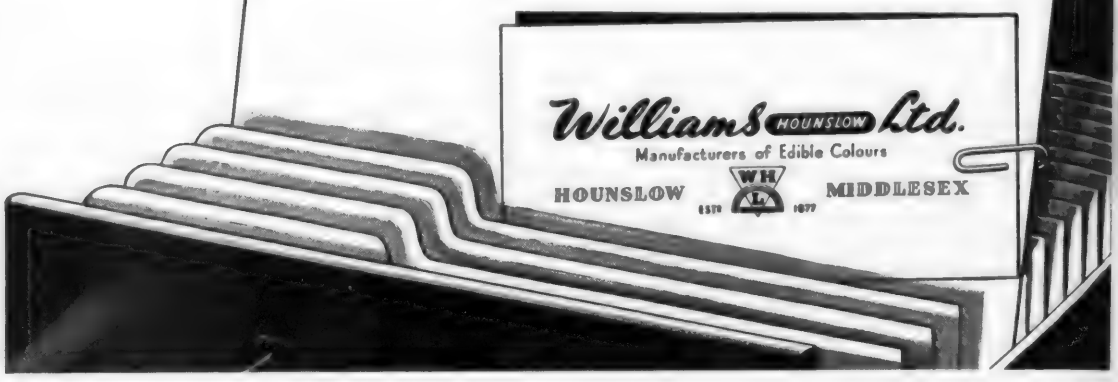
These people (see attached) are absolutely reliable. All their Edible Colours are guaranteed pure and harmless.

You will find them willing to help on all problems - possess fine laboratory.

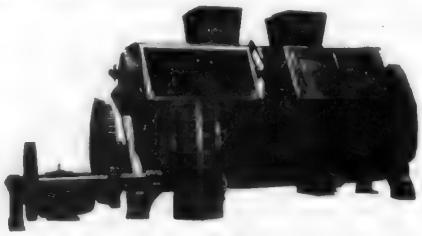


ATLAS
Sifters and Mixers

Atlas sifters and mixers give a perfect blend in the shortest possible time.

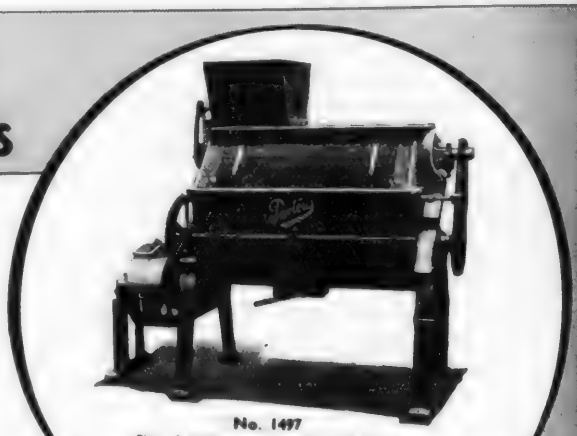
Experienced engineers with years of practice in the solving of mixing problems, design these machines to produce the highest possible yield with a minimum of labour.

May we send you a catalogue or give you expert advice on any mixing problem?



No. 1586

No. 7a size Patent "Atlas" Sifter and Mixer direct coupled to Electric Motor through Double Spur Reduction Gear and fitted with Twin Sifters.



No. 1497

Size 4 Machine with gear and chain cases removed—can be supplied belt-driven or direct motor-driven.

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GEORGE PORTEUS & SONS (LEEDS) LIMITED
LEEDS BRIDGE WORKS *Provender Milling Specialists* LEEDS 10

YOU CAN'T HAVE GOODS

IF WE DON'T HAVE YOUR EMPTY CONTAINERS!

SAVE C.R.S CONTAINERS, HELP FIGHT SHORTAGES!

This is not a threat, but a "straight-from-the-shoulder" fact. *Unless manufacturers have your returned containers, they can't give you the goods.* There is no alternative. And it isn't as if you have to go to much trouble, anyway. Just simply—don't give away containers, don't damage or destroy them, but put them aside for the C.R.S. van to take back. Vans collect during normal deliveries, and C.R.S. vans also make regular additional collections. Cash is paid on the spot.

This is all you need to do . . .

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3. Store them out of harm's way until collection.

Keep supplies on the move—co-operate with

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S.P.D. Limited,
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Operates throughout England, Scotland and Wales. Authorised Collectors of empty containers for Margarine, Compound Cooking Fat, Lard, National Household Milk (M.O.F.), and for many leading Food, Soap, Toilet and Household Product Manufacturers.

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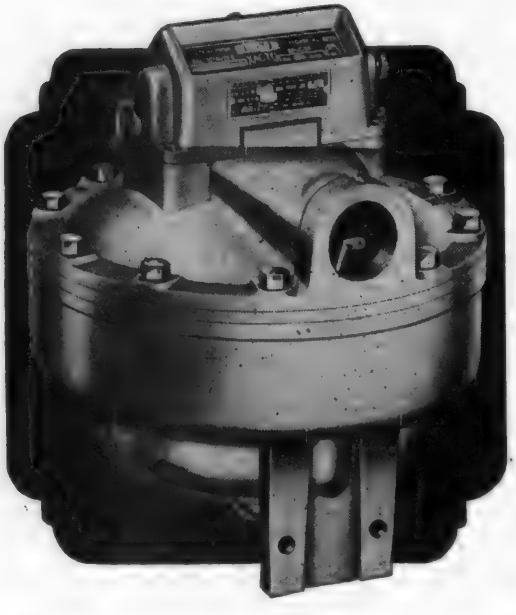

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Every drop of liquid can be accounted for by a **complete check to the highest degree of accuracy.**

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Actual Size 11 ins. × 12 ins. × 12 ins.

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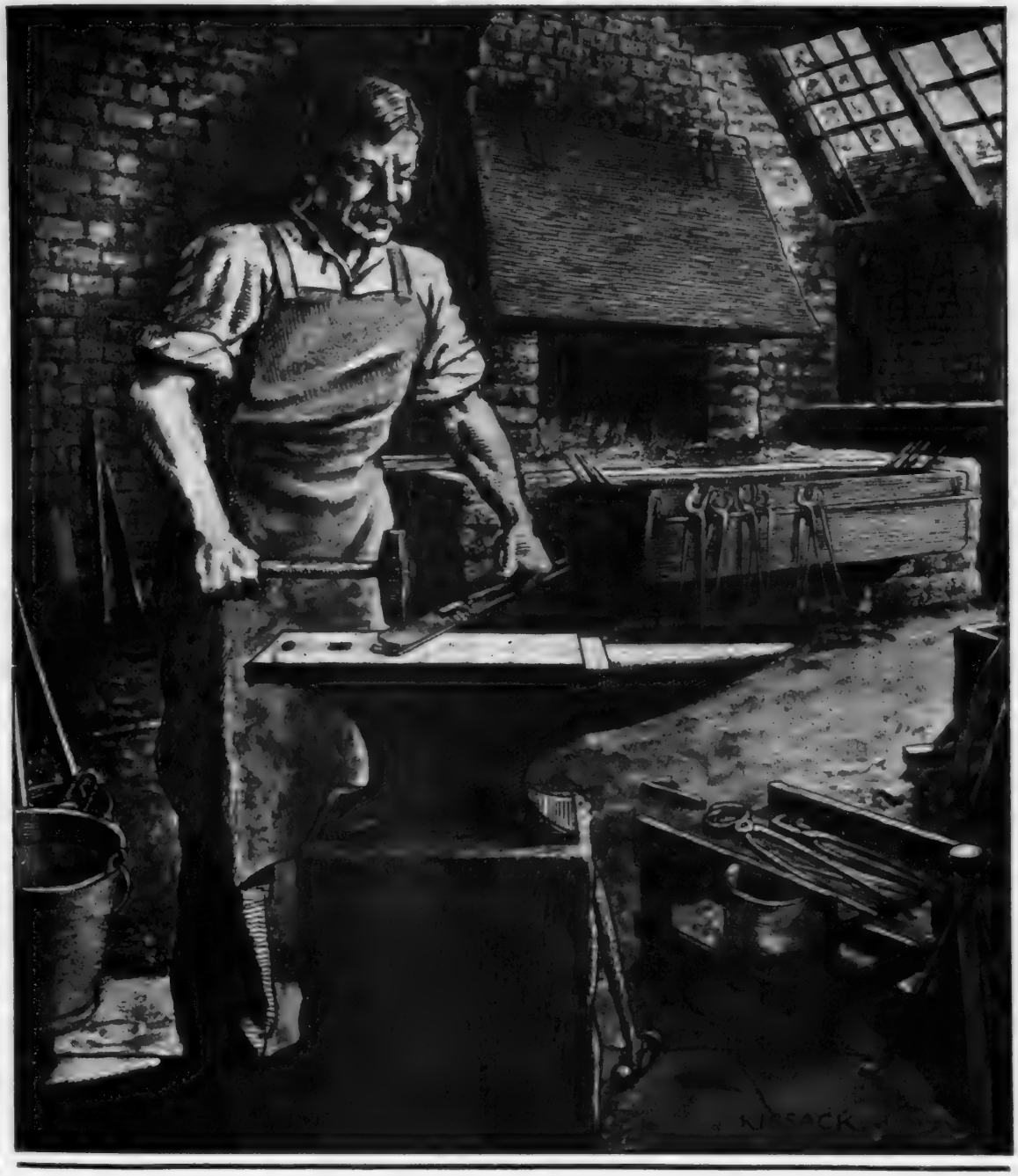

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FOR ALL TYPES OF FOOD PACKING BY HAND OR MACHINE. SAMPLES OR ADVICE WILLINGLY SENT ON APPLICATION

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1936

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which is specially manufactured for the Ice Cream Trade

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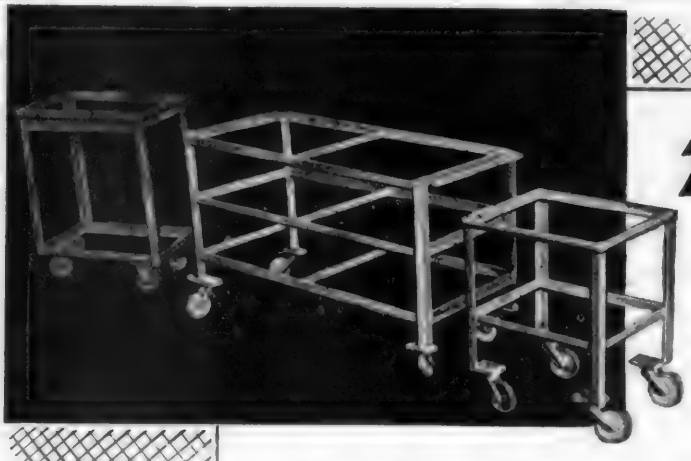

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SIEVING AND GRADING MACHINES

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ALL WORKING PARTS COMPLETELY PROTECTED AGAINST DUST
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DRIVE SHAFT RUNS IN A TOTALLY ENCLOSED HOUSING
BALL BEARINGS ENSURE SMOOTH RUNNING UNDER ALL CONDITIONS
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PATENT APPLIED FOR

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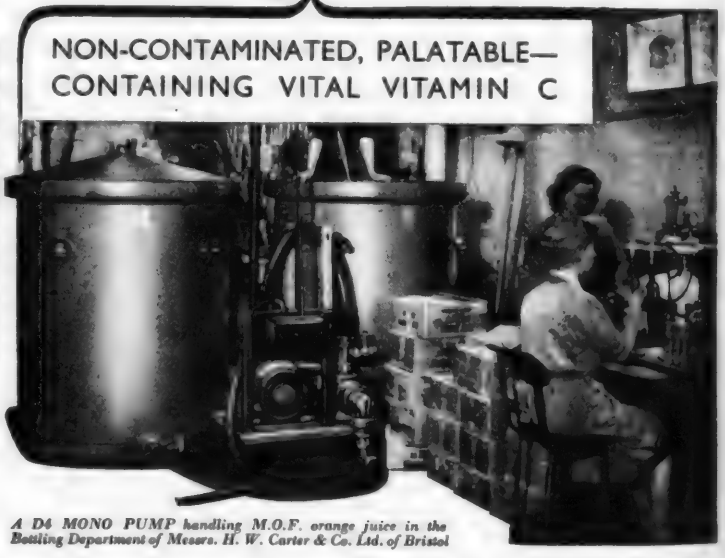
The Juice of 12 Fresh Oranges...

NON-CONTAMINATED, PALATABLE—
CONTAINING VITAL VITAMIN C



A D4 MONO PUMP handling M.O.F. orange juice in the Bottling Department of Messrs. H. W. Carter & Co. Ltd. of Bristol

Chosen for its meticulously clean handling of food preparations, the Mono Pump is used for pumping many essential food products, such as Ministry of Food Orange Juice, Rose Hip Syrup and Cod Liver Oil, which contain the vital vitamins needed for the young life of the nation. Contamination is avoided by virtue of the fact that no lubricant is necessary for the pumping element other than that provided by the liquid being pumped. The liquid or mixture, be it viscous or even carrying solids in suspension, is transferred gently and naturally with a uniform delivery flow without churning, agitation or aeration. Additional characteristics of the Mono Pump are self-priming, simple and robust construction and low maintenance costs. *Write for Food Leaflet FL.1 giving full particulars*

The **MONO** *Pump*

THE MODERN PUMPING PRINCIPLE

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MP 144 dm

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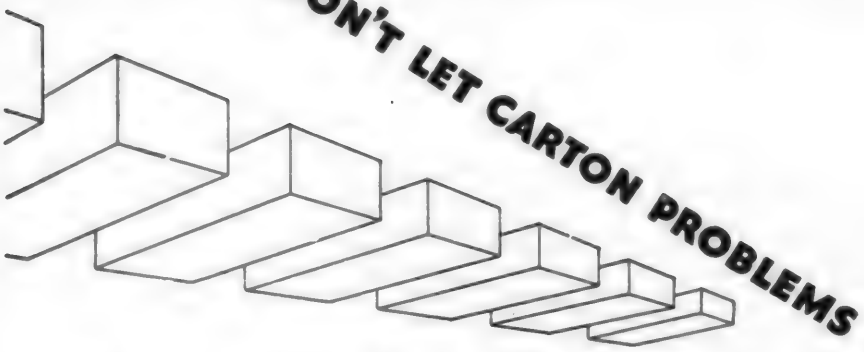

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Now is the time, before you swing into full peace-time production, to get your packaging situation lined up. It will never become a problem—if you tackle it now. Probably you have already some ideas of the form your containers should take. We have a brilliant creative studio ready to put your thoughts, or their own ideas, into tangible form.

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Measure your liquids with the

ASTON

Automatic Measurer

SIMPLE

The "Aston" Measuring Equipment represents the most efficient and economical method of discharging exact amounts of liquid in a simple and positive way, since it not only ensures complete accuracy, but saves a considerable amount of time and labour.

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With this unit a young boy or girl, or any unskilled worker, may be safely left in charge of filling operations without the possibility of mistakes occurring.

ENTIRELY AUTOMATIC

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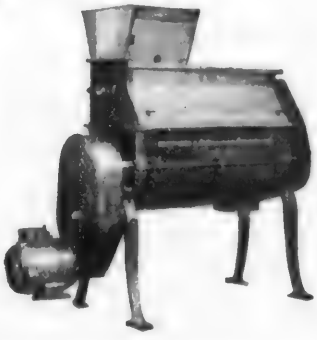

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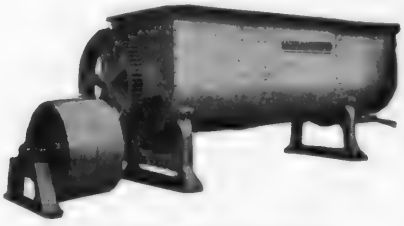

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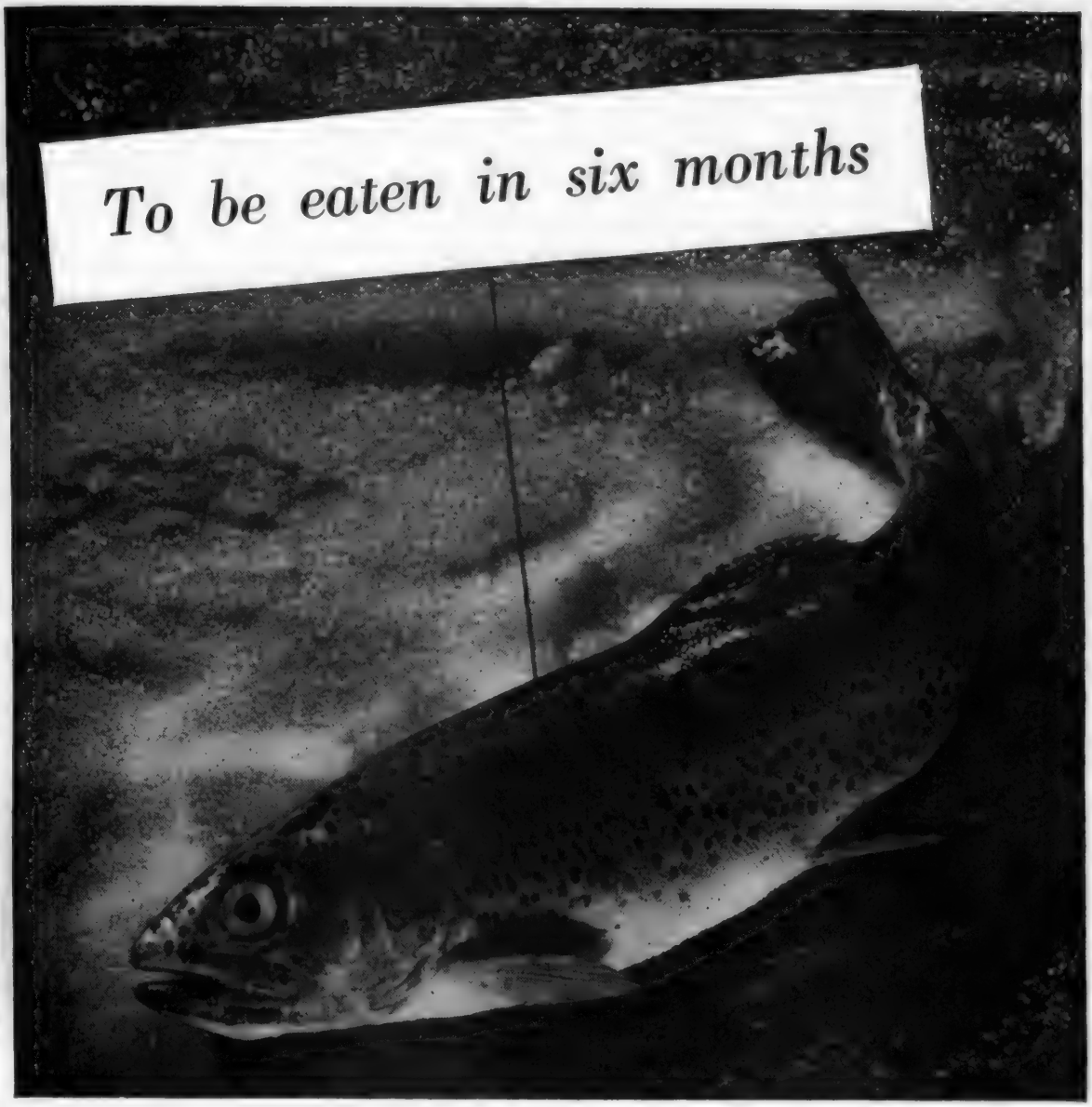

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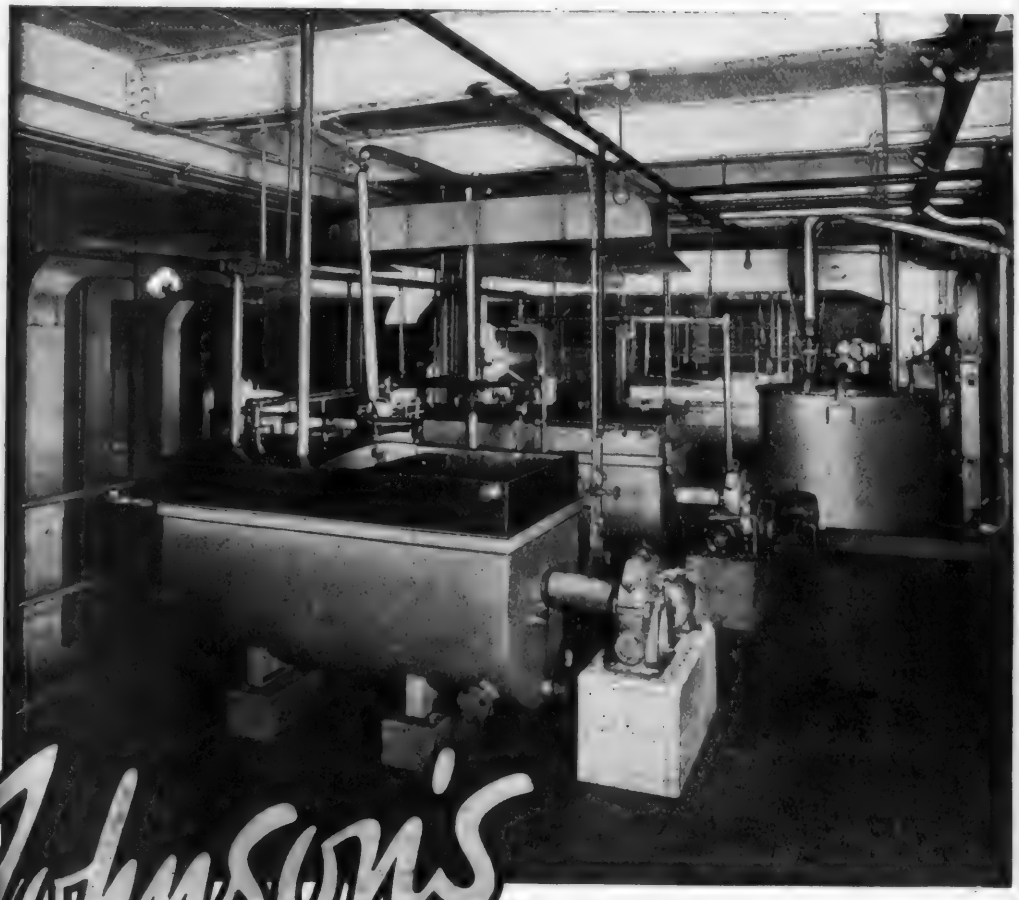

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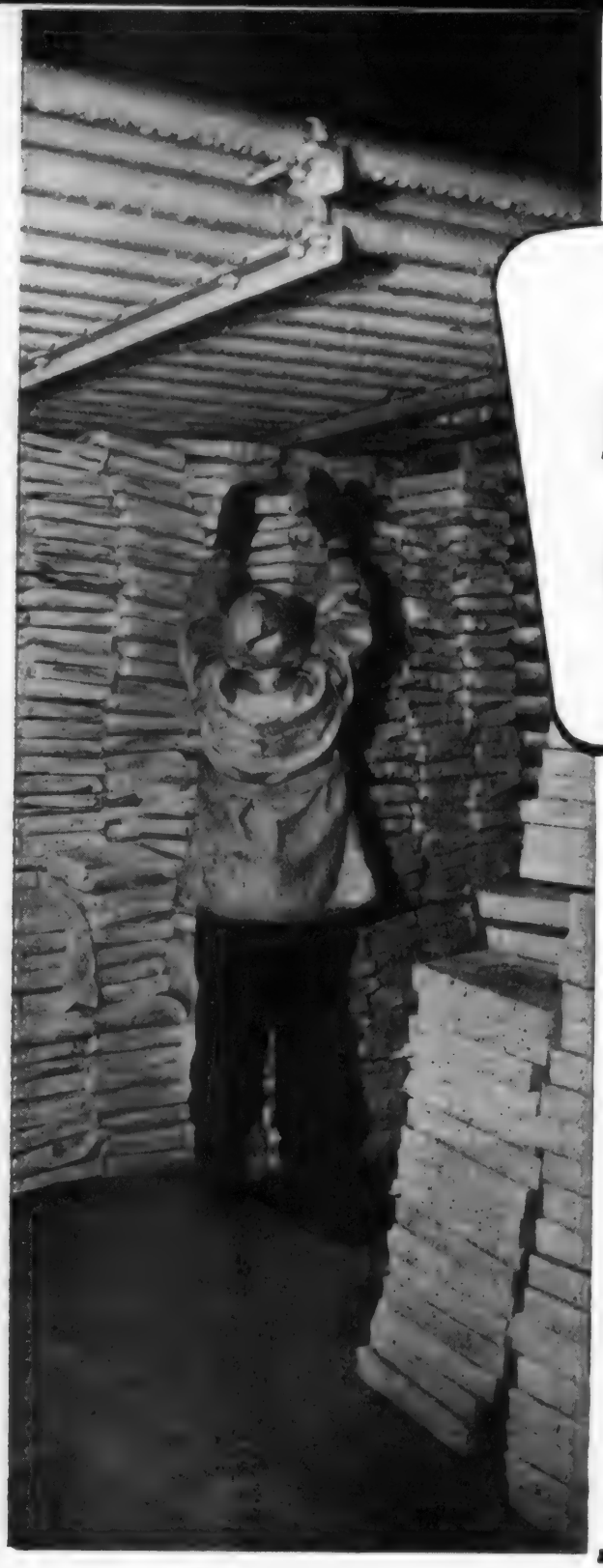

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FOOD MANUFACTURE

Vol. XXII. No. 9 · Published Monthly · September 1, 1947

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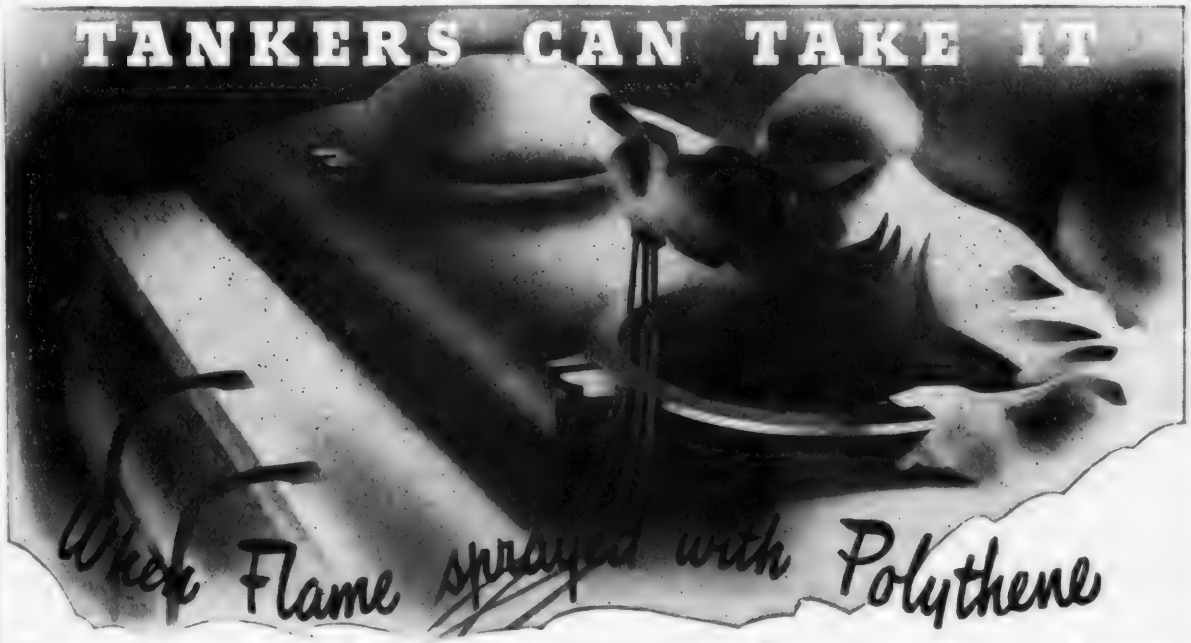
Published by Leonard Hill Limited, 17, Stratford Place, London, W.1. Mayfair (7383.)
Annual Subscription, Home and Overseas, 1 year 20s.; 2 years 30s.; 3 years 40s.



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FOOD MANUFACTURE

Vol. XXII, No. 9 September 1, 1947

A Notable Month

JULY was a month of breathless activity for chemists. The Centenary of The Chemical Society was celebrated July 14-17; the XIth International Congress of Pure and Applied Chemistry, July 16-24; and the Annual General Meeting of the Society of Chemical Industry, July 28-31.

This almost bewildering succession of academic and social meetings was attended by every British chemist of eminence as well as the rank and file to whom eminence is still an aim, and whose experience during those days must doubtless have stimulated them in their ambitions. Joining the British chemists were delegates from many parts of the world.

It would need several whole issues of FOOD MANUFACTURE adequately to do justice to the three events. It would be invidious to select for quotation or comment any of the many eloquent speeches made. Doubtless they will provide subjects for the writer and the speaker for many a day to come.

Demand for Quick-Freeze Cabinets

A large demand is developing for quick-freeze cabinets, with the large multiple groups taking the lead and placing orders for considerable supplies against autumn delivery.

The bulk of the business is from English cities, although demand is nation-wide. Rather less interest is being shown from those areas which have traditionally enjoyed an ample supply of fresh food, but even in such centres large stores are ordering and urging delivery. Co-operatives are also ordering these cabinets and are equipping a large number of their stores with them.

A leading Scottish manufacturer who had a prototype model on show earlier this year has now finalised the design, which is in actual production and delivery. Demand, according to this manufacturer, is being only partly met by reason of limitations of material and labour.

The opening of new factory units earlier this year and the adoption of mass production and assembly methods has undoubtedly assisted. Production will be expanded increasingly, and there is every indication that the refrigerating industry regards this aspect of its work as having major importance now and in the future.

Rather less activity is reported on the freezing side, largely because of the considerable capital cost involved in laying down suitable plants. There are, however, quick-freezing units now at work in England, Scotland, and Ireland handling a wide variety of food products.

Relatively little freezing is being undertaken in Scotland, although herring are now being treated at Lerwick, and further experimental work is proceeding in Aberdeen. The development of Northern Ireland as a source of quick-frozen food is regarded as of particular interest since even pre-war Ulster was subject to the variations of glut and scarcity, which can now be largely eliminated by use of quick-freeze methods.

Most of the leading store organisations throughout the country have instructed their executives to study the development of the changes which will result from widespread marketing of quick-frozen food, and some have already reported their opinion that the method will largely revolutionise certain aspects of food retailing.

Irish Imports

The importation by Eire recently of large supplies of Dutch chocolate, Danish and Czecho-Slovakian boiled sweets, and Australian and South African jams and marmalades, which fill no essential need and only build up paper profits for those concerned, is being criticised by some Irish food manufacturers who consider that, though such luxury goods help the supply position, it would be better if Eire's imports were confined for the present to basic foodstuffs and machinery.

Much of the country's food processing plant

and machinery is out of date or feeling the strain of the " make do and mend " policy of necessity adopted when new parts and fittings were unobtainable.

Those in Eire who expected that the end of the war would mean new machinery were disappointed; for Britain, with her eyes on the dollar countries, has avoided the reproachful glances of her former customers in Eire, or so one Irish manufacturer has put it.

Linseed Cultivation in Britain

Though linseed oil is very much the concern of the paint industry, as is flax fibre in textiles, linseed cake as an invaluable feedingstuff has long been appreciated. Greeks and Romans began it; the Abyssinians in more recent times roasted linseed; while even the oil has been adapted to some extent in the Soviet Union, Poland, and Hungary for edible purposes. Professor G. E. Blackman has corrected the belief that linseed cultivation was a gamble forced on us by floods by pointing out that as far back as 1941 an Imperial College research team took up linseed development, a subject now being continued at Oxford. Far from being a " panic crop," he recalled how linseed, unlike soya and other experimental efforts in " cold, bleak Britain," has in field trials and extensive farm scale tests reached a production level superior to that in the United States, Argentina, and India.

Linseed history has been one of careless harvesting, hampered by weeds and grasses, and of adulteration of the oil with sesame and rape seed oil—hence the Linseed Association of 1864, a Union out to banish such practices. At one time cold-drawn oil, clear yellow, and so devoid of taste and odour as to encourage use for food, came from first pressing. The insatiable demands of the paint trade altered this, expression under heat becoming the common practice for maximum yield.

Time and methods have changed in the new cultivation designed for years of general austerity, with chemical control of weeds cancelling the susceptibility of linseed to become engulfed. In the absence of unfavourable weather, linseed is a " hundred days' crop." Sown later than spring cereals—June sowings in Fenland were the order of the day where pumping rendered this possible—linseed has enabled a crop to be gathered in places where agriculture seemed impossible this year. This oil-bearing plant has indeed won favour with the Ministry of Agriculture. Six pounds per ton is being paid for every acre sown in flooded land and £40 per ton (plus carriage) for seed at the mills.

After soya and sunflower have struggled against our climate, any other contestant in the ring should certainly have our backing.

Fruit and Nut Kernels as Food

Writing in *Chim. et. Ind.*, 1947, **57**, 331-5, on this subject Raymond Talon includes under the term " bitter almond " all those " fruits " which are capable of producing cyanogenesis; but what are really referred to are not fruits at all, but the kernels of certain nuts or fruits (almonds, apricots, plums or prunes, and peaches) which contain the glucoside, or amygdalin, together with an enzyme or diastatic complex which, in the presence of water, is able to split up the amygdalin into hydrocyanic acid, benzoic aldehyde and glucose. This enzyme is synaptase, or emulsin.

During the war years sweet almonds and other oleaginous fruits and nuts became so scarce in France that it was necessary to find possible alternatives; and so far as these were obtainable in the so-called bitter almonds, it was further essential to find means for rendering them non-toxic, and to remove or reduce the hydrocyanic acid content within the limits of tolerance. In France this limit was at first 0·02 per cent. (decree of 1912), but in March, 1942, it was reduced to 0·01 per cent.

The author, M. Talon, had already in 1941 published a pamphlet on " The bitter almond and food industries " (Paris: Mourlot, November, 1941) in collaboration with Fouilon, Labor. Ets., in which, among other things, attention was directed to the similarity between these almonds and peas and beans of the Java or Birmanie type, which may contain up to 0·250 per cent. of hydrocyanic acid, and were included in the prohibition under the 1912 decree.

Various methods are described for treating the almonds to render them non-toxic, *i.e.* to reduce the hydrocyanic acid content down to the prescribed tolerance limit. These include heating in aqueous medium, heating or drying in hot air, and hydrolysis. The first two are deemed insufficient or defective, and, discussing these, the author says that destruction of the emulsin cer-

tainly results in both cases. But amygdalin, though in itself non-toxic, can be decomposed with production of hydrocyanic acid even if the enzyme has been destroyed. This latter in an active form may be present in other foods, and in this or other ways the amygdalin can be broken up in the digestive system with consequent formation of the poisonous acid.

Hydrolysis is regarded as the only really effective method. It depends on the permeability to water of the almonds, concentration of each constituent in aqueous medium, the *p*H, and temperature. The right conditions are easily realised on an industrial scale. The volume of water used should be four or five times that of the almonds and it should be changed every twelve hours, the time of operation being 60 to 100 hours, according to whether the almonds are hulled or not. The activity of emulsin is maximum with a *p*H of 5·5–6, at a temperature not exceeding 50° C. By this means the hydrocyanic acid and bitter taste are completely eliminated. Between 1940 and 1945 large quantities of bitter almonds were thus hydrolysed in France without any loss of nutritive value.

Special interest appears to have been given to apricot kernels and the extraction of oil from same, *e.g.* by the method used by Rothea and de Bon in 1918.

Italy's Food Position

Food consumption in Italy was never very high, and during the years immediately preceding the war there were only 2,650 Calories available daily for every inhabitant of the country. Only 20 per cent. of this came from fats, and 15 per cent. from proteins, while the remaining 65 per cent. was made up of carbohydrates.

The war reduced this average still further until in 1945 it fell to 1,500 Calories daily. The second half of 1946 brought a considerable improvement, and the increased food production in the country resulted in an average of 1,700 Calories. If the 2,000,000 tons of wheat and various other foodstuffs imported are added, the figure will rise to about 2,200 Calories. This is still 450 Calories short of the pre-war standard, but it shows a welcome increase of 700 Calories over 1945.

The poor prospects for this year's wheat harvest have made further improvements doubtful during the next twelve months.

It is interesting to note that, although a food rationing system exists in Italy, Italians have to depend for about two-thirds of their food upon the free market. In fact, during the first quarter of 1946 the daily average provided by the rations amounted only to 747 Calories. By the end of the year this rose to 957 Calories, but fell again to 854 in the beginning of 1947. The rations, furthermore, do not cover the most nourishing food, and in 1946 bread accounted for 74 per cent. of the Calories, while macaroni or rice provided 16 per cent., fats 5 per cent., and sugar 5 per cent. Consequently there is a strong tendency in the country in favour of abolishing the rationing system altogether or leaving it only for the benefit of the poorest classes.

Secondary Constituents of Wine

Following up earlier work on the production of succinic and acetic acids, butylene glycol, and related substances in alcoholic yeast formation, it has lately been shown that the relationship between the numbers of molecules of succinic acid (s), acetic acid (a), butylene glycol (b), acetylmethyl carbinol (m), acetaldehyde (h), pyruvic acid (p), and glycerol (g) should theoretically accord with the equation:

$$5s+2a+b+m+h+p=g.$$

This equation is derived from the hypothesis that all six substances on the left-hand side occur in a glycero-pyruvic fermentation as detailed by L. Genevois, E. Peynaud, and J. Ribereau-Gayon (*Revue des Fermentations*, Vol. 2, 1947, pp. 103-109). Experimentally these authors have shown that both for laboratory fermentations and for a series of normal sound clarets of different years and vintages, the equation $5s+2a+b=0{\cdot}9g$ holds almost exactly (m, h, and p are usually small). This finding supports the hypothesis already mentioned, and suggests that an important addition has been made to knowledge about the course of vinous fermentation. It may also serve as a test for spoilage in wine. Whenever the wine has soured, the volatile acidity will have increased at the same time as the amount of glycerol has diminished, so that $5s+2a+b$ will be found to equal or exceed g. This appears likely to occur when the volatile acidity much exceeds 15 millimolecules per litre. For sound clarets the approximate average values (in millimolecules per litre) are: s 7·5, a 12·5, b 8, g 80, with small variations; thus s in twenty-one samples ranged only from 5·4 to 9.

A Colonial Development Corporation

On June 25 the Secretary of State for the Colonies announced to the House of Commons the Government proposal to establish a Colonial Development Corporation with borrowing powers of about £100,000,000. "An instrument is required," he said, "whereby we can undertake individual productive projects likely to increase the wealth of the Colonies themselves and to stimulate the supply of products of which this country and the world at large stand in need."

The responsibility to develop Colonial resources for the benefit of the outside world and for the prosperity and advancement of the Colonial peoples themselves has long been accepted. The Colonial Development and Welfare Acts of 1940 and 1945 were aimed particularly at improving social and other services in the Colonies and at providing the basic services, such as communications, agricultural service, water supplies, and so forth, necessary for improved further economic and social development. But the funds available under this Act are not enough properly to discharge the dual mandate under modern conditions, and it is obvious that unless a rise in the standard of living is accompanied by economic development sufficiently rapid to absorb the increased populations resulting from these higher standards, and maintain them at those standards, serious problems must arise. Such development would obviously require a far greater investment of capital than is provided for under the Colonial Ten-Year Plans.

In introducing the Act of 1945, Colonel Stanley, then Secretary of State for the Colonies, recognised the part played by private enterprise in developing the Colonies, but referred to the necessity of capital investment which would not depend on quick returns. He then outlined the possibility of Colonial Development Companies, not to supplant but to supplement private investment, which would gradually "pass over to the private investor in the Colony both the capital burden and the managerial responsibility." The first example of this kind of public company appeared on January 1 of this year when the Cameroons Development Corporation was set up. This scheme to develop ex-German plantations by converting them into native lands, appointing the Governor as trustee and granting a perpetual lease to the Corporation, involved about £1,750,000. Then followed the plan for mechanised production of groundnuts in East and Central Africa; a scheme on a much vaster scale involving capital investment beyond the reach of a Colonial Government. The £25,500,000 will be granted by the British Treasury; the total area involved is 3,210,000 acres; and the farming operations will employ 32,000 Africans. The proposed Colonial Development Corporation is the natural culmination of this new approach to the duties of the dual mandate. In announcing the proposed Colonial Development Corporation, Mr. Creech Jones emphasised that the Corporation and its subsidiaries would work in close consultation with Colonial Governments "in order to ensure their activities are conducted in the way best suited to promote the welfare of the Colonial peoples." World food shortages and shortages of raw materials have obviously been an incentive in the planning of this Colonial Development Corporation, but it is equally clear that use is being made of the opportunity not only to benefit the world at large but to promote the prosperity and advancement of the Colonial peoples for whom they are trustees.

Championship Steaks

Lack of success against overseas competitors in so many branches of sport has perturbed many Britons now asking the reason why. Are we decadent, or too much absorbed in sterner things like pondering over the warning that we work or want? Is it our food—or lack of it—which is the cause, as is argued by one school? As if to confirm this idea came the report that Kramer, American tennis star who twinkled so brightly at Wimbledon, brought 65 lb. fillet steak and a special consignment of vitamins with him. What special fodder from France did Pearl Diver enjoy, we wonder, enabling him to pass the Derby winning post so swiftly? In a country depending so much on lesser proteins like the ubiquitous sausage (or even on the more mysterious "Ghoulash" offered on the menu of a civic restaurant!), the South African cricket team might readily find reason for their lack of success, as might overseas oarsmen at Henley explain defeat by referring to other things than any "crabs" they caught. To find the best food for championships it is useless watching our ports to see what our rivals bring in. Only the other day a Frenchman was fined at Marlborough Street for customs evasion when he landed with cartons of labelled foodstuffs. These turned out to be nylon stockings which will win him nothing but, perchance, the heart of some fair lady.

Caledonian Oatcakes

The manufacture of oatcakes, which is of growing importance, is almost entirely a Scottish industry. Like porridge, oatcakes have been most appreciated to date in the country of their origin. The operations described in this article are typical of a blend of mechanisation and craft handling.

FOOD shortages have encouraged a greater readiness to try everything once; as a result porridge and oatcakes have been increasingly used over the Border and have established themselves as important items of food. To consolidate that position is the hope and intention of the Scottish oatcake industry in the next decade. Those concerned believe that the market so established can be held, and are convinced that a greater public is more interested in oat products than ever before. In view of the potential national market for these, appropriate plans have been made.

The oatcake industry is taking an active part in this expansion, and during the war years reached the status of an organised body, known as the Associated Oatcake Manufacturers, with all the important specialist firms in membership, located throughout Scotland with the larger and better-known plants in Glasgow and Edinburgh, both traditionally important centres of the baking industry.

Methods of production vary considerably, as is to be expected in the case of a craft industry, although in recent years semi-mechanisation has been adopted by some of the largest concerns.

In the first place there are firms which adhere tenaciously to methods traditionally associated with cottage production, which is almost entirely a craft process demanding workers of a high level of skill. On the other hand, an increasing number of makers contend that an excellent oatcake can be produced by factory methods using a limited amount of mechanisation, allied to traditional craft procedure.

Evidence of this latter trend in one large Glasgow factory suggests that this claim can be substantiated. In this factory the routine is an interesting blend of modern straight-flow methods plus craft handling plus limited capacity through lack of facilities. The oatcake industry, like others, is suffering from an eight-year lapse of development and the depreciation of existing plant and equipment. There is every reason to believe that newer plants now being planned will incorporate straight-flow processing, mechanised handling and conveying, and other food industry methods to a greater extent than is possible even in the most up-to-date cake factories where the newest plant was installed just before the war. In the plant under review, oatmeal arrives from the miller in bags and is stored by type. Preferences range through fine-cut, mid-cut, and pinhead oatmeal and each maker blends to his own selection as experience and sales results dictate.

The Mixing Operation

The meal is conveyed in trolleys to an adjacent section on the main floor where an overhead rail system services four large bins storing the meal required for current mixing. Two pans are suspended on the overhead rails in which meal is

Different grades of oatmeal are selected, weighed in the overhead scales, and tipped into the mobile tub.

The oatmeal and other ingredients are mixed, the tub of the mixer being released for conveyance to the cutting and sheeting machine.

The cutting and sheeting machine is fed from the feeding mouth in the rear and delivers a sheet of thin dough below the cutting section, which stamps out the cakes and delivers them to the tray in the foreground.

The cakes are removed from the hot plate and stacked on racks for removal to the packaging department.

weighed out, according to the approved formula, and delivered by these pans into the mixing tub.

In this plant the mixer is a Silkydo, the tub of which is released for conveyance either to the meal bins or to the cutting and sheeting machines after mixing. The normal load is 200 lb. of meal, to which are added pure fat, salt, sugar, baking soda, and water.

It is worth noting at this point that the shortage of fat for oatcakes has definitely limited their production to pre-war standard, and that the current popularity has been achieved during a period of lesser perfection.

The Cutting and Sheeting Machine

The mixer has two rotating arms, operating counterwise, one with an anchor-shaped arm and the other with a double prong. The mix is stiff, glutinous, and not easily worked, and is normally given twenty to twenty-five minutes' processing before being transferred to the cutting and sheeting machine. This is a comparatively new development and one which demanded a considerable period of research and experiment before the various processes could be successfully mastered. They are now definitely proved as practical, and have assisted greatly in achieving a major volume of production by the elimination of the more tedious and less highly skilled parts of the work. Although opinions will differ, the belief is held that this machine achieves virtually the same results as hand operation would give, with the advantages of speedier work, greater precision, and reduced cost.

The mix is fed from the mix tub to the feeding mouth of the machine and passed under rollers to flow in a thin perfect sheet first below a dusting section, which sprinkles dry oatflour, then to a second section where a roller eliminates any knots or bumps, and finally under the cutting head. This stamps out the desired shape, the operator quickly removing the scrap, which is fed back on to an overhead conveyor operating in the reverse direction, back to the feeding mouth.

The cut shapes are automatically piled at the receiving end on to delivery boards which are carried off to the hot plates. Normal delivery from such a machine amounts to 300 round cakes and 200 three-cornered cakes per minute.

Cooking Methods

It is at this stage that mechanisation gives way to craft handling. The firing of oatcakes is essentially a job demanding not only skill but reliability from the operatives. This skill is developed in handling the crisp wafers of oatmeal, all the senses —touch, sight, and aroma—aiding final perfection.

In this plant there are eighteen long hot plates. Gas firing is regarded by some firms to be preferable to coke firing, by reason of its greater reliability, its cleanliness, and its uniformity of control, although tradition favours coke firing, but perhaps only because of the lack of new equipment in recent years.

An interesting type of oven used where space is a consideration is the Collins 5Dex, which has five ovens set one above the other. While suitable for oatcakes, this type of oven is preferred for shortbread.

The shaped wafers are laid on the hot plate and cooked for approximately fifteen to twenty minutes at about 270° F. Clocks are used to time the firing, but the operator develops a considerable degree of intuitive skill which warns when baking is approaching completion.

The Drying Process

As the cakes are fired they are collected on wire mesh trays above the ovens and transferred to the drying press where any remaining moisture is removed by electric heat. The time involved in this process varies according to the moisture content, but when started in the evening will be finished the next morning.

The drying being complete, the cakes are transferred on racks by trolleys to the packaging sections. The cakes are packed by hand, no machine having yet been devised which can successfully pack such brittle material. The content of the packages are controlled at the cutting and sheeting machine stage by the precision setting of the control to a given thickness of sheet. This obviates the necessity for continuous weighing, but periodic test weighings are made on scales provided on each packing bench as a check on machine accuracy.

The Hexagonal Container

Packaging adopted by different manufacturers varies considerably, but a significant trend has been noted in recent months by the introduction of a hexagonal waxed box. The protruding edges give added strength to the pack and protect the circular cakes which they carry and which are packed in a white-waxed wrap. This box is actually being produced at a lower rate than was the circular type. Prevailing conditions are limiting the extent to which these new developments may be exploited, but manufacturers are carefully studying packaging requirements to ensure that their product will be both efficiently and attractively packed and displayed.

One interesting unit in use at this point is a self-sealing device, consisting of an electrical element under sheet metal. The waxed paper is heated over the element and slid to the lower cold section of the metal where the wax solidifies.

The brittle nature of the oatcakes makes hand packing the only possible method. The oatcakes are packed in the new six-sided containers.

It is natural that different manufacturers in the industry have preferential methods of packaging and displaying, but it is significant that, as in mechanisation, there is a similar trend towards standardisation of packaging.

In this particular plant the packed cakes are loaded on trays of the type normally used by bakers and fed through a check point to a second check point and so on to the despatch department.

Distribution and Transport

Distribution is effected by various methods—grocery and bakery outlets carrying a considerable bulk of the trade. This does not prevent a direct mail trade being done, and it is possible that marketing promotion may encourage the use of this method in due course. The problem is essentially that oatcakes are both brittle and semi-perishable, and for this reason it is difficult to foresee a major export trade being done, although pre-war Scottish makers sent their cakes to many of the Dominions and to the U.S.A., and do so to some extent at the present time.

Perhaps the most favoured method of distribution is that used in the factory, where a fleet of vehicles make direct contact and effect direct delivery to retailers throughout Scotland. Rail transportation is also used to a considerable extent and remarkably little loss by breakage has been experienced in either method.

Reference has already been made to the need for reliable labour, and managements on their part have attempted to provide modern premises with canteens, baths, and rest-rooms for their employees.

Future Prospects

The future of the industry is dependent to a very considerable extent on the readiness of the public to accept oatcakes as a part of their diet. It may be that, for those outside Scotland, oatcakes are in the nature of an acquired taste. Current experience suggests, however, that the British market has not been exploited to the full, and that a very great expansion of consumption is possible in England, Ireland, and Wales, with a lesser expansion of sales also possible in Scotland.

Firms in the industry are now preparing plans to attempt this conversion towards oatcakes; the popularity and evidence in the form of order files from English sources suggests that the market is definitely open to conversion. The intention is to sell oatcakes as a traditional Scottish bakery product and to avoid any attempt at "gilding the lily."

Some experiments have been made to coat oatcakes with chocolate. The fact that this experiment was not continued stresses the point that there are food affinities which cannot be ignored. Oatcakes are ideal with cheese, butter, marmalade, honey, jam, for tea; there might also be a considerable expansion of their use as a basis for *hors d'œuvres* and with soups. If present indications are reliable and permanent, however, the major field is undoubtedly the tea table, and every effort will be made to hold and expand the outlets already developed.

The fact that for the first time the industry is working as a co-ordinated unit through its Association (although firms have full personal freedom within the general framework) promises that a definite policy will be pursued, and that immediately fat, machinery, and premises are again freely available a considerable forward drive will ensue.

Eire's Natural Resources

DEALING with investigations into the chemical composition and the industrial possibilities of seaweed, the recently issued report of the Eire Research Council says that determinations of alginic acid, laminarin, and mannitol have been continued on samples of *Laminaria digitata* and *L. Cloustoni* collected each month. Records of the seasonal variations of the chief constituents of these two algae extending over a period of four years will soon be available.

Determinations of the xylan content of monthly samples of *Rhodymenia palmata* have been commenced, and processes are being investigated for the extraction of xylan and for the preparation of xylose from the xylan. Xylans form a viscid solution which should be useful as an emulsifying agent. *R. palmata* appears to be common and more easily harvested than carrageen, and it is possible that xylan produced from it may be able to compete commercially with the material obtained from other sources.

The report adds that the systematic survey of the marine algae of the Irish coast has been concluded. Arrangements have been made for the publication of the results in a handbook giving descriptions of each of the more common seaweeds which occur on the coast. A complete herbarium to illustrate the handbook has been prepared and deposited in the National Museum. With a view to ascertaining the possibility of increasing the output of certain seaweeds, particularly the laminarians, an investigation was commenced during the year as an extension of the survey of marine algae into the factors affecting growth. Selected beds of *Laminaria* were weeded and cut, and observations are being made with a view to collecting data in regard to regeneration, the average life of the plants, and the number of plants per unit area in the experimental beds as compared with "wild" beds.

Ministry of Food

Latest Statutory Rules and Orders

The list given below is the continuation of the list of Orders published in *Food Manufacture*, August 1, 1947, page 344.

No.	Date. 1947.	
		PRICE FIXATION ORDERS
1316	June 26.	Order amending the Fish (Control and Maximum Prices) Order, 1946.
1464	July 10.	Order amending the Cereal Breakfast Foods (Control and Maximum Prices) Order, 1947.
		CANNED FRUIT AND VEGETABLES
1317	June 26.	Order amending the Canned Fruit and Vegetables (No. 2) Order, 1946.
		FEEDINGSTUFFS
1428	July 7.	Order amending the Feedingstuffs (Regulation of Manufacture) Order, 1947.
		FISH
1332	June 27.	Fish (Licensing of Dealers and Processors) Order, 1947. (The Order does not apply to the sale or processing of fish which is not subject to price control.)
		FRUIT
1318	June 26.	Order amending the Fruit Pulp Order, 1945. Revokes S.R. & O. 1946, No. 1242.
1423	July 5.	Imported Fruit and Vegetables (Amendment) Order, 1947.
1424	„ 5.	Order amending the Imported Pears Order, 1946.
1482	„ 11.	Order amending the Soft Fruit Order, 1947.
		GRAINS
1234	June 20.	Home Grown Grains (Sack Charges) Order, 1947. (Increases the deposit charges which may be made for returnable sacks, and the charges which may be made for non-returnable sacks (other than M.A.F. sacks) on sales of home grown grains.)
		LABELLING
1310	June 25.	Labelling of Food (General Licence) Order, 1947. (Permits for a limited period the sale of beer brewed in the United Kingdom free from the labelling requirements of the Labelling of Food Order, 1946.)
		MILK
1304	June 25.	Milk (Non-Priority Allowance) (No. 2) Order, 1947. Revokes S.R. & O. 1947, No. 722.
		POINTS RATIONING
1231	June 19.	Order amending the Food (Points Rationing) Order, 1946.
		POTATOES
877	May 9.	Order amending the New Potatoes (1947 Crop) (No. 1) Order, 1947.
927	„ 14.	Order amending the Potatoes (1946 Crop) (No. 2) Order, 1946.
1100	June 4.	New Potatoes (1947 Crop) (No. 2) Order. Revokes S.R. & O. 1947, Nos. 639, 877.
		RATIONING
1003	May 22.	Order amending the Fats, Cheese and Tea (Rationing) (No. 2) Order, 1946. Revokes S.R. & O. 1946, No. 2236.
1104	June 5.	Order amending the Food Rationing (General Provisions) Order, 1946.
1152	„ 13.	Food Rationing (General Licence No. 6) Order, 1947.
1473	„ 11.	Order amending the Meat (Rationing) Order, 1946.
1474	„ 11.	Food Rationing (General Provisions) Order, 1947.
1475	July 11.	Rationing (Personal Points) Order, 1947. Revokes the Rationing (Personal Points) Order, 1946.
1476	„ 11.	Bacon (Rationing) Order, 1947.
1478	„ 11.	Fats, Cheese and Tea (Rationing) Order, 1947.
1479	„ 11.	Meat (Rationing) Order, 1947.
1480	„ 11.	Sugar and Preserves (Rationing) Order, 1947.
		SOFT DRINKS
1511	July 17.	Order amending the Soft Drinks Order, 1946.
		VEGETABLES
1060	May 30.	Order amending the Green Onions Order, 1945.
1305	June 24.	Carrots (1947 crop) (No. 1) Order, 1947.

The Despatch Floor: Its Organisation and Equipment

E. H. B. PALMER

Faults in method are as difficult to discard as those in manner, morals or speech. Therefore, economy in space, time and labour must be the guiding principle if the method of operating a despatch floor is to be above reproach.

THE average executive will receive plenty of theoretical encouragement from his superiors. While they will certainly look in his direction for economy, it does not follow that they will pursue this line of thought by giving him full rein. This is unfortunate, because an intelligent and experienced and enthusiastic executive on the despatch floor is bound to have his own theories which are the result of practice and observation and which he is professionally anxious to test.

The unwritten law in every despatch department should be "Don't talk to the man at the wheel"; and, provided he has confidence in himself and his men, no executive in charge should brook interference in that for which he, alone, is personally responsible. He should be tactful not only with those who can give him the sack but also with his colleagues in other departments whose activities dovetail with his own. Incidentally, many faults to be found on a despatch floor are faults by reflexion. That is to say, they have originated elsewhere, hence the advice regarding close and sympathetic liaison.

A food factory is a large and complicated machine, each part of which must work in unison from one end to the other. To have goods "inwards" and goods "outward" passing over the same banks, across the same floors, and employing the same elevators, is to provide a first-class groundwork for all sorts of trouble. Sympathy is due to those concerned where such conditions are unavoidable.

Premises located and designed to meet the requirements of many years ago are unlikely to lend themselves to that which they are called upon to face today. Nevertheless, a little more initiative even under these conditions might materially help matters. For example, there could be a schedule so devised as to leave the banks and the floors and the elevators comparatively free for one operation or the other. It will test the highest quality of flexibility and it will be affected by external factors, such as the arrival of vehicles, but it is worth trying.

As an operation, despatch should be, in itself, straightforward. An environment of confusion will prove a tragedy here. Every executive will know exactly what is meant by orderly confusion, which is inevitable at moments of high pressure, but this must not be made the cloak for lack of control, waste of effort, or misuse of everything which might so easily be co-opted to a better result.

Recording of Loads

On a despatch floor there must be room for assembly into loads, and these should be stacked in rotation. It should be made impossible for a last minute complement to a load to sneak on to the floor unobserved and to get shoved away in a corner where it will stand a very good chance of being overlooked. Each load should be properly documented. In these days of counting-house mechanisation, such documentation is apt to be a little overdone. It may please internal and external audit to have half a dozen multicoloured flimsies covering what is a perfectly simple transaction, but the unhappy carman has a lot to say about this and may be sympathised with.

The despatch floor and the loading banks should be kept free of impedimenta. Possibly, to employ all the fixed and mobile equipment offered would be ideal—were the space available. In the handling of merchandise and material automatic loading gear should be flexible and removable, and never in evidence except when in use. Trucks and trolleys, skids and baulks, tackle for lifting and tackle for hauling, should all be "parked" in recognised places and returned to them. What is more, whatever relations exist with other departments they should not extend to the loan of your equipment. Gear out of repair is impedimenta. It should be sent away to be repaired or scrapped.

It is not without reason the despatch manager is warned against encroachment. The space available never seems to be sufficient and there is the definite risk of the overflow of some other department invading the despatch floor and hampering its operations. The most ingenuous offender will be the

"empties," for here an excuse can often be made with some justification. They have to be sent out of the premises and this constitutes a species of "despatch." On the other hand, no department should have the right to send its goods forward regardless of system or control, for in that way bottlenecks are created. There is the tendency to do so, but it should be remembered that the despatch floor and the loading banks being the "last horizon," they can do nothing about it.

Each operation on a loading bank should be clearly defined as far as is possible. Half a dozen vans can be dealt with at one and the same time, but not because one of them cannot be completed. This would be bad management and would only lead to overlapping of labour, waste of time, waste of equipment, and general confusion. "Shorts" and cross-deliveries arise from this.

The place of the driver and his mate is on the vehicle. As soon as goods pass over the tailboard into their charge the job of tallying and stowing must be left to them. The tailboard is the natural boundary and many a query will be avoided if this is recognised and respected.

Labour in relation to assembling and loading needs organising and drilling into its job. Even if it is reduced to two men, confusion is possible through one falling over the other. Again, there is the hard-working, over-anxious, and enthusiastic type of executive who simply cannot witness an example of clumsy effort without putting his own shoulder to the wheel. This is all wrong. The physical result will be problematical. The logical result will be that he is not attending to his own job—that of getting the best out of his team. He is, in fact, on a par with a navigating officer who attempts to stoke the boilers.

Free-lancing should be discouraged. Whoever volunteers to "give a hand" should be fully employed elsewhere. Unnatural noise is as indicative of trouble as it would be in the gears of an otherwise smooth-working machine and, in this connexion, the ear of an experienced executive is as sensitive as that of a highly trained technician.

It is possible to be muscle bound or over organised. Whatever rules and restrictions may be evolved, they must be capable of readjustment at short notice and there must be an elasticity in schedules, otherwise something will crack.

In conclusion, the fact should be emphasised that the whole of a factory forms one complicated machine of which the despatch floor and loading banks are integral parts. The quality of flexibility is important, even if schedules have to be re-cast daily. Human effort can be directed into machine-like infallibility by those who control it. Assets not to be despised in the hurly-burly of the despatch floor and the loading banks are a cool head and a sense of humour.

The Profits Tax

THE Excess Profits Tax and the National Defence Contribution (now called the Profits Tax) were two taxes additional to income tax, but the one was alternative to the other. Consequently, as during war-time most firms were chargeable with Excess Profits Tax, little was known of the National Defence Contribution. The Profits Tax applies to most concerns, the exceptions being professions and statutory undertakings (*e.g.* gas and electricity).

The tax is 5 per cent. for companies, other concerns 4 per cent.; profits up to £2,000 per annum do not attract the tax, and where profits exceed this amount but are less than £12,000 there is an abatement of one-fifth of the difference between the actual profits and the sum of £12,000. To show how this applies, take as an example profits of £4,000. There is a difference between this amount and £12,000 of £8,000, and one-fifth of £8,000 is £1,600; therefore, taking this amount from £4,000, we get £2,400, which sum only attracts the tax. Therefore a company would pay a tax of £120 (£2,400 at 5 per cent.), any other concern £96 (£2,400 at 4 per cent.).

While following income tax principles (Schedule D business profits) as regards assessments, nevertheless, there are important differences, one being that, unlike income tax, where profits in the year preceding the year of assessment apply, current profits apply and payment of tax is due within one month after assessment.

Not deductible as trading expenses for income tax, interest, annuities, and other annual payments are so deductible for Profits Tax. On the other hand, "annual value" deductible for income tax (where premises are owned) is not deductible for Profits Tax.

Profits Tax payments are deductible for income tax, but income tax payments are not allowable for Profits Tax assessments. An important provision under Profits Tax procedure is that the amount to apply for an expense for a director's remuneration is restricted for director-controlled companies (presumably to prevent extravagant sums being charged so as to eliminate or diminish profits for tax), so that the amount to apply for expenses must not exceed 15 per cent. of the profits computed before deducting director's remuneration, or £1,500, whichever is the greater, the deduction, however, in no case to exceed £15,000. This provision does not apply in respect of any "whole-time service" director, meaning a person in a full-time directorial position, not owning more than 5 per cent. of the ordinary share capital. Other firms (*e.g.* individuals and partnerships) can be assessed as director-controlled companies for this provision if they so choose, but then the tax becomes 5 per cent. as for a company and not 4 per cent. as otherwise applies.

The " wear and tear " allowances for machinery and plant relating to income tax apply likewise for Profits Tax, as does the special depreciation allowance which applies to buildings, machinery or plant (provided since December 31, 1936) which have become redundant or fallen in value with the end of the war. The date for determining when these conditions are fulfilled was laid down by Finance Act, 1946, as December 31, 1946.

The Finance Act, 1947, alters the above somewhat as regards rate of tax and applies to profits in accounting periods up to December 31, 1946. On profits after that date the rate will be 12½ per cent. for companies.

West African Vegetable Oils

ALL interested, not only in groundnut cultivation, but in palm oil and benniseed or sesame oil, will find food for thought and visualise more food for Britain in a recent report* published by the Colonial Office. This surveys in a welcome, concise style the position in Nigeria, the Cameroons, the Gold Coast, Sierra Leone, and Gambia as regards land utilisation and rural economy, production and recommendations for future policy, as well as delving fairly fully into such problems as shipping and transport of labour.

Such problems with the need for a general scientific survey justify fully the publication of this report at a time when Government departments are being taken to task for extravagance during the paper shortage. Emphasis is needed to instil the rule that in Nigeria at any rate, as distinct from Gambia, where available land is in excess, fertility decreases while soil erosion increases; that only with better administration, in which native communities should join, and with co-operative societies, will the future bring improvement.

In reviewing actual crops with an eye to increased exports, groundnuts are given first place. A light soil and moderate rainfall explain why in Northern Nigerian provinces this annual is predominant, 200,000 tons decorticated nuts representing a year's harvest; Gambia follows with 40,000 tons, while Sierra Leone and the Gold Coast have negligible amounts for export. *Arachis hypogaea* may be adopted as interplanted crop between millets or guinea-corn; or it may occupy the whole field acreage. Trials at the Kano Experimental Station, even on unmanured land similar to native farmland, show an average possible yield of 700 lb. shelled nuts per acre. From Nigeria total tonnages for export have fluctuated from approximately 326,000 tons in 1937 to as low as 142,000 tons in 1943 (though there have been increases since then). Gambia, with an export surplus of the order of 40,000 tons annually, is underpopulated, with vast tracts (suitable for large-scale mechanical farming of groundnuts) not as yet cultivated. Moreover, Gambia, with its river navigable for deep-sea ships as well as lighters, offers transport possibilities unmatched by other West African colonies. In Sierra Leone, on the other hand, groundnuts have actually been imported until recent years to maintain local consumption; but demands of the Services brought a vastly increased production and created a surplus now estimated at 500 tons annually.

Turning to palm oil and kernels, native methods offer obstacles to increased exports. From the wild Nigerian palms the rule is to cut nuts only from the tops of trees, laboriously strip them of fibre, crack them by native women labour, and extract the kernels. Despite production drives by the Nigerian administration, all the fruit is not harvested, some kernels not being used at all; and yet internal consumption must be maintained to counteract the low standard of living of native farmers and to compensate him for exporting groundnuts in quantity. Native methods of expression yield 13 lb. oil per 100 lb. fruit, a figure which improved by up to 25 per cent. by employing hand presses now being distributed by the Department of Agriculture. Even this hand-press method could well be replaced by Pioneer oil mills recovering 85 per cent. of oil. Sierra Leone, it is recommended, might well make the industry more attractive to an unambitious native content with the barest subsistence level.

Annual exports of benniseed or sesame oil from the Benne Province of Nigeria are seen in the report to have fluctuated remarkably from nearly 23,000 tons maximum in 1942 to 3,775 tons in 1944, for example. This is explained in part to the call-up of young men for the Services and to others transferring to tin mines following intensive production of that metal. Yet the future should be brighter, it is anticipated, without diminishing groundnuts production as a priority, provided the Ministry of Food pay a price comparable to that paid for this first essential. In Gambia the yield of benniseed has been from 400 to 500 lb. per acre. But here again any increase would be at the expense of groundnuts.

Apart from such data of immediate interest to food industries, the report deals with such commercial and economic matters as export prices, consumer goods, shipping, railways, road transport and its possible improvement. Appendices enable one to follow oil, oil seeds, and palm kernel production and export figures for several years.—M. S.

* *Report of the Mission appointed to enquire into the Production and Transport of Vegetable Oils and Oil Seeds produced in the West African Colonies.* Colonial Office Report No. 211. London. Pp. 76. Price 1s. 3d. net.

Stilton Cheese

The resumption in Leicestershire of the manufacture of Stilton cheese, the best known of our mould-ripened varieties, will be welcomed by connoisseurs who regard it as the queen of British cheese.

MORE experience and skill are required to produce a really first-class Stilton than any other cheese. The proportion of such cheese in the output of even a first-rate maker is smaller than for other types. This is because more factors are concerned in the ripening of Stilton than in the non-mould-ripened varieties. The mould which develops in Stilton and causes the characteristic blue veining or marble effect grows during the later stages of ripening, when changes in the structure of the cheese produce cracks and fissures and so permit the entrance of air. Unlike bacteria, moulds require air for growth. This is the reason why moulds do not grow in the interior of properly made Cheddar and similar types.

History of Stilton-Making

It is believed that in the early history of Stilton-making it was prepared from uncooled morning's milk and the cream of previous evening's milk. The effect would be to give a milk of high fat content and a cheese of marked richness and mellow character. At a later stage the method of using curds of different makes was employed. In this process, curd prepared one day would be mixed in with the curd of the following day's make. The effect of this would be to produce an open texture, allow more air to penetrate the cheese, and so promote the growth of the blue mould, *Penicillium roqueforti*. This method had certain disadvantages, however. Thus, on cutting, the two curds would show different colours, especially if one was from morning's and the other from evening's milk. Difficulty was also experienced in controlling the acidities of the two curds.

Present Method of Manufacture

In general, it may be said that the sweeter or less acid the cheese that is made, the more important it is that the milk should be as free from bacteria as possible. This is because fault-producing bacteria are inhibited by acid. In Stilton-making a clean milk supply is of first importance. The milk should preferably not be cooled, and 1 dram of rennet is used for 4 gal. of milk at a temperature of about 85° F. Coagulation requires from sixty to seventy minutes. The junket is considerably softer than that produced in making hard cheese and requires careful treatment. The characteristic feature of Stilton-making is the ladling of the curd. The receptacles for receiving the ladled curd are prepared by laying wooden laths across a sink at intervals of about 18 in. Bags are prepared by placing damp cheese-cloths over the laths. The cloth thus acts as a strainer, retaining the curd while the whey collects round the bags, thereby assisting in the development of acidity and keeping the curd warm. When the bags are full they are formed into bundles, by folding over the ends of the cloth, and left in the whey until about 0·12 per cent. acid has formed. Some of the whey is then run off and more whey allowed to

The weighing and salting of the curd. Salt is added at the rate of 1 oz. to 3 lb. curd.

The ladling and straining of the curd. Damp cheese cloths are used as strainers.

ooze out of the bundles. After about an hour the process is repeated, and when the acidity has reached about 0·17 per cent. the bundles are turned over. The acidity should progress uniformly; a falling off in the rate of acid production may result if the drainage process is long drawn out or if the temperature falls. At an acidity of 0·2 per cent., the curd is turned out into the sink and the acidity should develop sufficiently slowly so that it can be left overnight. When a suitable acidity has been reached, the curd is broken into pieces about 1 in. in size and salt added at the rate of 1 oz. to 3 lb. curd. The salt should be allowed to dissolve thoroughly before the next operation.

The filling of the hoops is started with the smaller pieces of curd, which are lightly pressed down by hand; the larger pieces are then placed in the middle and smaller ones on the outside. This assists in the production of the right texture and lays the foundation for the forming of the coat. The temperature of the curd at this stage should not be less than 62° F. Drainage takes place on calico squares laid on boards and the boards and the cloths are changed daily for about ten days, the temperature being maintained at 62° F. The cheese are now shrunk sufficiently to allow the moulds to be slipped on and off quite easily and the sides of the cheese become quite greasy. The next stage is to scrape the surface of the cheese and fill the scrapings into the crevices, which materially helps in the formation of the characteristic Stilton coat. A calico bandage is then pinned tightly round the cheese, which is replaced in the mould. The cheese is later rescraped, this time lightly; too drastic a scraping will result in a thick, heavy coat which is no longer fashionable. After bandaging, the cheese are placed on the draining shelves and turned daily and rebandaged until a coat shows signs of forming and dry patches appear on the bandage. When a fine, white mould begins to grow

The cheese take from three to four months to ripen and weigh from 10 to 18 lb. each.

the bandage may be removed. Careless handling of the cheese must be avoided as the ripening process is largely dependent upon the coat, the best conditions for the formation of which are a low temperature and a high humidity.

The cheese should still be turned daily, and when a good coat has formed the cheese may be removed to the ripening cellar, which should have a temperature of about 58° F. Ripening requires up to six months, depending on the size of the cheese and the temperature and humidity of the ripening-room. As in the case of other cheese, the best Stilton are produced when the ripening takes place most slowly. A blue-veined cheese of a sort can be produced in six weeks, but this time does not allow of the proper sequence of changes which are necessary for the production of the true Stilton flavour. The growth of mould in any cheese depends on the amount of air that can penetrate the cheese; consequently Stilton can only "blue" when cracking takes place in the curd. Many makers of blue cheese, therefore, now "prick" their cheese by stabbing with a knitting-needle or similar instrument. In this way a small passage is made which allows the entrance of air more rapidly than would otherwise take place. Although this method does in fact increase the extent of mould growth, some authorities consider that the idea has been rather overdone, and that pricking has resulted in a blue-veined cheese with properties not quite the same as those of the true Stilton.

Stilton is made in two sizes, one weighing 10 lb. and the other 16 to 18 lb., which is more commonly made for the London market. A good Stilton should be evenly veined throughout the interior and the coat should not be too thick. Really good Stilton will always find a market at a good price, the demand coming chiefly from clubs and hotels. Second-quality Stilton, however, suffers in competition with Gorgonzola. This state of affairs is rather similar to that between second-grade farmhouse Cheddar and the Dominion products. Stilton-making is attended by considerable risks and expense. If the maker can produce at least 60 per cent. of first-grade cheese his business should be run at a profit. On the other hand, a high percentage of poor cheese will result in a heavy loss. Variations in quality are more frequent with Stilton than with any other common cheese. An attempt was made to make Stilton in Holland, but, as is usually the case with such endeavours, the Dutch product could not be considered a true Stilton.

Stilton cheese are made chiefly in the Melton Mowbray district and the prize Stiltons at the shows usually come from this area. It is generally held that first-quality Stilton cannot be made in other localities. This may be true, but no definite reason can be assigned to it.

Air Conditioning in Bakeries

THE vagaries of the weather have for long been, and still are, responsible for some of the difficulties experienced in controlling certain industrial processes with the precision which is necessary for the production of the highest quality goods. The temperature and humidity of the atmosphere affect materials and processes in varying degrees, and while in some instances the control of temperature within specified limits may be all that is required in order to avoid the harmful effects of extreme conditions of humidity, in others both temperature and humidity must be held within fairly narrow limits if satisfactory results are to be obtained.

Air conditioning found its earliest industrial application in the textile industry, but its use now extends to other spheres; foodstuffs, tobacco, and chemicals are among the goods now being produced with its help.

The baking industry is among the most recent in this country to show an interest in the improvement which can be effected in its products by the control of atmospheric conditions. That this interest has not been displayed earlier cannot be attributed to any belief that atmospheric temperature and humidity have no influence on bakery processes and materials. In all probability the reason is to be found in the fact that a big proportion of the bakeries in this country are comparatively small in size and "small" bakers doubtless hold the view that, despite the benefits to be obtained from air conditioning, their small output would not justify the capital outlay. For the bigger baker, however, this argument does not apply with the same force, and indeed many of them are now critically examining the possibilities of air conditioning and not a few are beginning to put their ideas into practice.

In a truly pioneer work* on this subject, Mr. J. R. Seville has performed a unique service to the baking industry. Within the modest compass of some 150 pages he has packed much sound advice and instruction on the why and how of air conditioning in the bakery. The author claims, no doubt justly, that his is the first publication to deal exclusively with the subject for the baking industry. It is a book for bakers, written by a baker in a manner which happily avoids the confusion of too many technical terms.

The subject matter of the book, which incidentally is devoted almost exclusively to bread production, is divided into three sections. In the first of these the general principles of air conditioning are set forth with commendable brevity and clarity. In the second, the application of these principles

* *Air Conditioning in the Baking Industry.* By J. R. Seville. Pp. 152. London. 25s. net.

to breadmaking processes is dealt with rather more comprehensively, while in a short third section some useful notes are given on the care of air conditioning equipment. An excellent glossary and several charts and tables complete the book.

Section two contains the real meat of the book and deals in turn with each stage of the breadmaking process, starting with the flour store and ending with the bread store. Each chapter is in two parts, the first explaining why and the second showing how air conditioning should be undertaken.

The author is undoubtedly right in his contention that it is best to consider each stage of breadmaking as a separate item and to condition each separately, for although the overall process of breadmaking is a continuous one nevertheless different stages of it require different temperatures and humidities. Moreover, the expense of installing conditioning equipment may be spread over any desired period by adopting the unit system.

All stages of the breadmaking process can be shown to benefit from the application of air conditioning, and it would be difficult to single out any one as least requiring it from the technical point of view, but from the production point of view there is no doubt that the installation of an air conditioned, combined bread cooler and store is an attractive proposition in that it tends to smooth out irregularities in the despatch of bread from the bakery by closing the gap between one day's production and the next, a distinct advantage in these days when production capacity is being taxed to the uttermost. This is in addition to a marked improvement in the condition of the bread at the time of its sale.

The loss of moisture from flour which generally occurs in a flour store, although it can be offset at the mixing stage, is shown by Mr. Seville to be a not infrequent cause of irregularity in production. As in the dough fermentation room, the application of air conditioning is here not so much a means of increasing yield by preventing water loss as a guarantee of consistent good quality in the finished bread. So, too, in the final prover and oven does suitable control of the temperature and humidity lead mainly to improved quality rather than to increased quantity.

Mr. Seville's book sets out in a clear and direct manner those arguments which would weigh most with the practical minded baker. No attempt is made to gloss over the many difficulties of air conditioning. These are faced squarely and compromises suggested. Incidentally much useful information of a general character relating to bakery technique is given in the various sections.

It is no small recommendation to the book to say that the author has had the courage of his convictions and has already installed, among other equipment, a commercial-scale air conditioned bread storage and cooling-room in his own bakery. He has checked a good deal of the earlier available information on the subject and also publishes for the first time much that is new.

It is unfortunate that the book does not deal with the application of air conditioning to the manufacture of cakes and biscuits for this would make it much more widely acceptable. It is to be hoped that this omission will be remedied in the near future, though there is still much in the book of value to cake and biscuit manufacturers and, indeed, to food chemists and food manufacturers generally.

Handy in size, the book is attractively bound and printed, and the author is to be congratulated on the many excellent illustrations which he has been able to include.—J. D. M.

Drawback of Customs and Excise Duties

FOLLOWING the announcement made by the Minister of Food in the House of Commons on July 14, 1947, that the Government had decided to allow the export of ten million pounds worth of manufactured foods, such as chocolates, biscuits, and beer, annually, it is stated by the Board of Trade that the export of these goods is now permitted under licence.

It should be more widely known that drawback, or repayment upon exportation of dutiable goods, of the Customs or Excise duties previously paid thereon may be claimed by persons other than the actual importer, refiner, or manufacturer. Drawback may be claimed in respect of such goods as sugar, cocoa, etc., and on "composite" goods (*i.e.* articles containing those ingredients) not only when they are exported to a customer overseas, but also when they are shipped for use as ships' stores or deposited in bonded warehouse for ultimate exportation or use as ships' stores.

Generally speaking, drawback rates approximate the amount of duty previously paid on importation. In the case of imported sugar there are three main classes of Import Duty, depending on the country of origin. Owing to difficulties of supply and distribution still prevailing from war-time conditions the rates of drawback have been "consolidated" so that the exporter is entitled to claim at the existing British Refined non-Empire scale, irrespective of the actual origin of the sugar and/or

molasses. For a full list of import duties and rates of drawback the trader is referred to the current issue of the Customs and Excise Tariff.

When the exporter of the goods is not the manufacturer, he, the exporter, should obtain from the manufacturer all the information necessary to complete his drawback bills and to substantiate them by documentary evidence if required. Similarly, the manufacturer of "composite" goods should obtain any statements necessary, from his suppliers of raw materials, as will satisfy H.M. Customs as to the amount of duty paid on importation, and, in the case of sugar, a refiner's Certificate of Polarisation in order that drawback may be claimed on "that quantity of dutiable ingredients which appear to the satisfaction of the Treasury to have been used in the manufacture or preparation of the goods."

Before claims for drawback are entertained, it is generally necessary to enter into a bond with H.M. Customs and Excise as a security for the due exportation of the goods. The bond may be a "general" bond to cover a series of shipments, or an "ordinary" bond to cover a single shipment only. Naturally it is to the exporter's advantage to take out a "general" bond as this does away with the necessity of taking out a bond for each shipment.

It should be pointed out that the granting of a Board of Trade export licence to the trader does not in any way constitute a claim for drawback. On the other hand the exporter is not bound to make a claim for drawback when he exports dutiable goods. In fact, it very often is not economical to enter claims for small amounts as there are various charges, such as "presenting to H.M. Customs" and so on, raised at the docks which can, and do, often amount to more than the value of the claim.

The food manufacturer's experience in form-filling should stand him in good stead as all claims for drawback have to be made on the appropriate forms. For dutiable goods exported direct as merchandise one of three forms is generally used —namely, No. 64 (Sale), No. 104 (Sale), or No. 128 (Sale). These forms are all clearly headed, so the exporter should have no difficulty in deciding which one is appropriate. In the case of goods shipped as ships' stores, and for goods shipped for use as mess and canteen stores on H.M. Ships, forms No. 36 (Sale) and No. 107 (Sale) respectively are necessary. Finally, for all goods deposited in bonded warehouse for eventual exportation or use as ships' stores, form No. 105 is to be used.

All drawback goods have to be inspected by H.M. Customs prior to exportation. This may be done either at the trader's own premises (in which case proper accommodation and weighing and sampling facilities must be provided), or they may be examined at the ship's side, in which event each package must be labelled "To be produced to the Officer of Customs and Excise before shipment."

When goods are to be inspected at the trader's own premises, the "duplicate" portion of the appropriate form, which embodies a "Notice to Pack," should be sent to the local Officer of Customs and Excise at least twenty-four hours before packing is due to commence. If the Officer does not attend at the time stated in the "Notice to Pack," the goods may be sent to the port of shipment and the "original" bill forwarded to the Customs Officer at the dock in time to reach him before the goods are received on board. Each package forming the consignment should bear a green "Exported on Drawback" label as they have to be identified by the master, mate, or authorised person of the carrying steamer, who also certifies on the "original" copy of the bill that the goods have been duly taken on board.

In addition to the Customs and Excise Tariff already mentioned, various notices are issued from time to time by H.M. Customs and Excise which the exporter will do well to study. In case of difficulty or doubt, however, the exporter is recommended to consult the local Officer of Customs and Excise, who is generally willing, indeed it is his duty, to give guidance and advice on the spot.

Export of Confectionery Products

THE United Kingdom has accepted responsibility for the supply to certain Britain colonies, and to certain other countries, of limited quantities of confectionery products from July 1 to December 31, 1947. These territories are known as programmed markets.

Cocoa Powder and Drinking Chocolate.—No exports are at present permitted to unprogrammed markets. Programmed markets for July to December, 1947, are Aden, Ascension and St. Helena, Bahamas, Barbados, British Borneo, British Guiana, British Honduras, Burma, Ceylon, Cyprus, Egypt, Ethiopia, Falkland Isles, Faroes, French Somaliland, Gambia, Gibraltar, Gold Coast, Hong-Kong, Iceland, India, Iraq, Jamaica, Kenya/Uganda, Lebanon, Malaya, Mauritius, Nigeria, Persia (Iran), Sarawak, Saudi Arabia, Seychelles, Siam, Sierra Leone, Sudan, Syria, Trinidad, Tripolitania, Windward Isles (Dominica, St. Lucia, and Grenada).

The total quantity available for export has been divided among U.K. manufacturers on the basis of

past performances in the export trade, and bulk export licences are being issued only to manufacturers for export to any of the above-mentioned destinations. Each manufacturer has, however, undertaken to supply an equitable share of his quota to his regular broker or shipper for export where this is in accordance with past practice. Brokers and shippers should, therefore, approach their normal suppliers who hold export licences.

Chocolate, Chocolate Confectionery, and Sugar Confectionery (other than Medicated Confectionery).—The question of exports to unprogrammed markets is still under consideration. Programmed markets for July to December, 1947 are Aden, Ascension and St. Helena, Barbados, Bermuda, British Borneo, British Guiana, British Honduras, Burma, Ceylon, Cyprus, Egypt, Ethiopia, Falkland Isles, Faroes, Gibraltar, Hong-Kong, Iraq, Jamaica, Kenya/Uganda, Lebanon, Leeward Isles, Malaya, Malta, Mauritius, Nigeria, Sarawak, Saudi Arabia, Seychelles, Sierra Leone, Sudan, Tanganyika, Trinidad, Windward Isles (Dominica, Grenada, St. Lucia, and St. Vincent), and Zanzibar.

Sugar confectionery includes chewing gum and peppermint confectionery.

As in the case of cocoa powder and drinking chocolate, the total quota for the above countries has been divided among U.K. manufacturers. Brokers and shippers should make the necessary contacts with the manufacturers who hold export licences.

Medicated Confectionery.—There is no restriction in the export of medicated confectionery either as regards quantity or destination. Export licences are not required for medicated sweets, but allocated materials used in the manufacture of medicated confectionery for export are not replaced.

Cocoa Cake.—A licence for the export of cocoa cake to any destination will usually be freely granted provided that the cocoa-butter content does not exceed 2 per cent.

In certain instances permission is given for the export of cocoa cake containing more than 2 per cent. of cocoa butter for the purpose of the extraction of the cocoa butter and the return of the cocoa butter so extracted to the United Kingdom. Applications for licences under this heading should state the cocoa butter content of the cocoa cake which it is desired to export and the amount of cocoa butter which the exporter expects to receive when it has been extracted.

Cocoa Butter.—By international agreement, cocoa butter may only be exported if the country of destination is prepared to surrender an equivalent quantity of cocoa beans from its allocation by the International Emergency Food Council in favour of the country making the export. The agreed rate is 100 tons of cocoa beans for every 40 tons of cocoa butter. It follows that cocoa butter can only be exported from the United Kingdom to a country having a cocoa bean allocation.

When, therefore, an application for a licence to export cocoa butter is received by the Export Licensing Branch of the Board of Trade it is referred to the Ministry of Food. The Ministry then ascertains whether the government of the country of destination is willing to surrender the appropriate quantity of beans and (since the Ministry has to buy them) whether they are of a type and at a price acceptable to the Ministry. Applications for an export licence should only be made when the country of destination has issued the necessary import licence (except in cases in which import licences are unnecessary), and the number of the import licence must be quoted on the application. It will be observed that some considerable time must usually elapse between the submission of an application and the decision as to whether it can be granted or not.

The cocoa beans used in the manufacture of cocoa butter which is exported are replaced by the Ministry. It follows that it is unwise for manufacturers of cocoa butter to enter into definite commitments in respect of supplies of cocoa butter for export until they have ascertained from the Cocoa Division, Ministry of Food, Portman Court, London, W.1, the price at which the beans will be replaced.

Subject to the conditions set out above, there is no restriction on the export of cocoa butter either as regards quantity or destination.

Chocolate Couverture.—For the purpose of export sweetened chocolate couverture is treated as chocolate. Unsweetened chocolate couverture is treated in the same way as cocoa butter, except that 100 tons of beans must be surrendered for every 80 tons of unsweetened couverture exported.

Price Control.—Attention is drawn to the Exports (Relaxation of Price Control) Order, 1946 (S.R. & O. No. 660). Copies of this Order are obtainable from H.M. Stationery Office or from any bookseller.

BOOKS RECEIVED

Orders for any of the books listed below or reviewed in this issue may be placed with the Books Department, FOOD MANUFACTURE, 17, Stratford Place, London, W.1. It is regretted that under present conditions it is not always possible to supply books by return of post.

Methods of Vitamin Assay. Prepared and edited by The Association of Vitamin Chemists, Inc. New York. Pp. 189. Price 21s.

The National Insurance Act, 1946. By Douglas Potter, M.A. London. Pp. 269. Price 21s.

The Inspection of Food Containers

GEORGE B. BEATTIE

The inspection of empty and full containers in the food industry is an important item in the maintenance of quality control. In some cases inspection may be made by electronic devices, but, in general, recourse to the human element is necessary. This brings a large number of problems in its train, the surmounting of which is discussed by the author.

IN all cases where transparent containers are employed it is conceded that an intermediate container inspection and a final container and contents inspection should be employed, while, when returnable vessels are in use, a primary inspection of the dirty empties is also advisable.

Intermediate Inspection

Final inspection devices have, perhaps, received the maximum attention, but it is the view of many packers that the intermediate container inspection is of even more importance. Obviously, the final inspection tends to concentrate on examination of contents, but with modern methods of processing the number of factors detrimental to the product which can arise during manufacture, filling and capping are almost negligible. The clean, sound and suitable container is the pivot of trouble-free production. Hence, the efficient "sighting" of vessels at or about the container-cleaner delivery point is looked upon by many sound judges as the salient factor. It is also economically unsound to fill good products into faulty vessels, and the more successfully these can be weeded out at an early stage, the better.

Similarly, if unsuitable containers can be detected before they are placed into the washer, waste of labour or product is avoided. This is chiefly of importance in dealing with returnable ware; but in all cases the slogan should be: "Arrest the faulty container at the earliest possible point."

Final Inspection

Final inspection methods may be comprehensive, dealing with all aspects of the problem, from detection of leakage to examination of the product for foreign matter, or they may be contents inspection devices only. To date, final inspection apparatus chiefly falls into the following groups:

1. Electronic devices.
2. Illuminated inspection boxes into which, or on which, the vessels are placed by hand.
3. Illuminated inspection panels placed behind lines of containers passing along conveyors.
4. Accumulator tables, with special lighting devices.
5. Leak detector and sealing efficiency detector apparatus.
6. Laboratory apparatus, designed to check from random samples such matters as colour, turbidity, homogeneity, measure, etc.

A Recent Electronic Device

Several "electric eye" robot sighters have, during the past few years, been produced, the most recent and perhaps the most notable being that devised by the Coca-Cola Company in conjunction with the Radio Corporation of America. This is a contents inspector, and is designed to work only with the firm's standard product in its standard bottles. The machine is in the form of a small rotary and is designed to dovetail with the normal bottle conveyor bringing the filled and sealed, but unlabelled, products from the production unit. The containers are passed into the machine by means of the orthodox star wheel, which is of standard design, excepting that, to guard the electronic devices from possible injury, a special timing device, a safety gate, and a trip mechanism (coming into play should a bottle jam or break) are incorporated.

The electronic principles utilised are in accord with well-established practice. A lamp, beam-focussing lens, and slit screen are provided to produce and transmit a beam of light through the container and product. The beam is narrow, but extends vertically over the whole length of the contents. The light passed by bottle and contents is caused to impinge on a bank of light-sensitive electron tubes, any deviation from the normal transmission giving rise to a minute change in potential. An electronic amplifier magnifies this current sufficiently to actuate a relay mechanism attached to a two-way selector arm. This arm forms the delivery mechanism of the device. Normally, it returns the products to the production line conveyor, but if there has been any change in the light transmission the selector arm is automatically moved through the medium of the relay to its alternative position, the bottles then being passed to a "rejection" accumulating table. An ingenious checking system comes into play after each individual inspection, and if the electronic parts are

faulty, the selector arm is automatically fixed in the reject position until the machine has been repaired.

Problems in Electronic Inspection

In designing this machine, two major problems had to be faced:

(*a*) correlating the required sensitivity for detection of minute specks in the product with the need to by-pass minor blemishes in the glass, and (*b*) the difficulty of getting stationary particles, especially types which normally rested on the bottom of the container, into the beam.

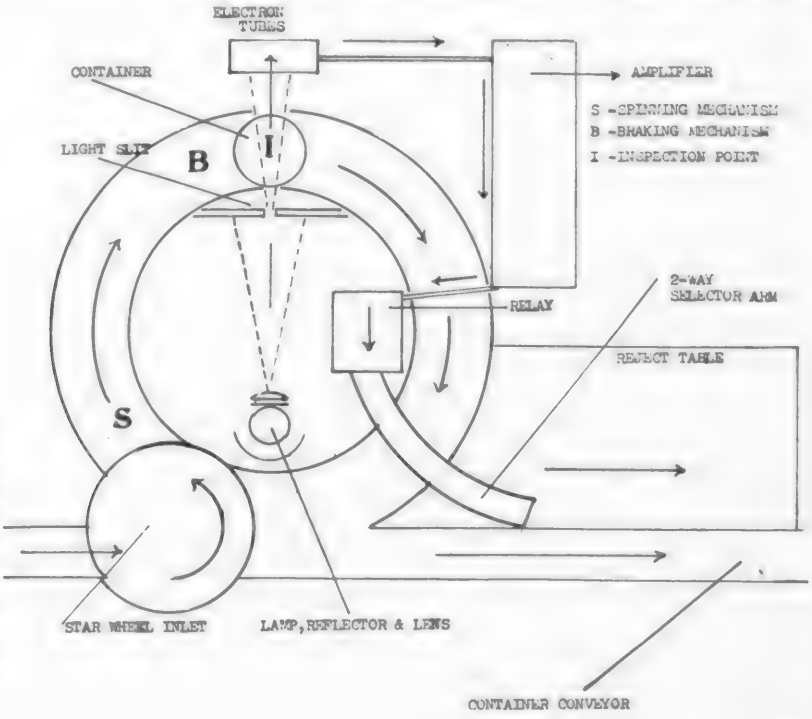
The designers have overcome both problems by a most ingenious device consisting of a bottle-spinning mechanism. The blocks of the machine are so arranged that the bottle is rotated with great rapidity as it enters the rotary path. It is then suddenly braked dead, just before the inspection point. The effect of this is to have the container absolutely motionless, but the contents whirling rapidly. Any particles, therefore, even if they have previously been residing on the bottom of the vessel, are set rapidly in motion and must pass through the beam, thereby registering positively with the electron tubes. As the container is quite still, small differences in colour of portions of the glass flaws do not register.

The device is, therefore, a contents sighter, pure and simple. Its applicability to general inspection is further limited because any change in colour of product, viscosity, and turbidity, or any difference in thickness of product, height of vessel, ornamentation or colour of the container or even thickness of glass, would call for a complete re-design. It is said that the device has taken over six years to perfect, and as it is only suitable for the firm's own single product and single container, any other firm wishing to employ the principle must be prepared to spend a very large sum and a great deal of time in further research. Nevertheless, the principle is sound, and it is possible that the comparatively few large firms who concentrate on a single product and standard pack may employ it in the near future.

Inspection Boxes, Panels and Tables

Where the practice is to process a number of different articles in different sizes and shapes of container, in comparatively small runs, it is doubtful whether robot sighting will ever be applicable, although further research may point a way. For some years to come, however, the packer of this type will probably have to depend on the human element.

The small, usually horizontal, inspection box is



The machine is arranged to operate in conjunction with an automatic production unit and inspection is not confined to a point as shown in the diagram. An ingenious synchronising mechanism and a reciprocating arm carrying the electronic devices enable the container to continue moving through a considerable arc while being inspected by the robot device.

chiefly used in conjunction with non-automatic or semi-automatic packaging. There are many varieties, but essentially, they consist of a light-proof box, with a series of electric lamps and reflectors throwing a beam, usually through some form of glare-reducing or diffusing screen. The bottles are placed, generally four at a time, by hand, over the screen, the inspector detecting any abnormalities. The preliminary shaking induced by handling assists in bringing specks into prominence and the uniform lighting helps to show up any container defects. In most instances the bottle or container holder is formed so that the vessels are held at an oblique angle. By varying the colour of the bulbs or screen, better effects can sometimes be obtained with certain colours of product, or colours of ware.

The vertical inspection panel is a very similar device, much used with fully automatic layouts. The most usual site is just before labelling. The panel consists of a rectangular box placed behind the line of vessels as they come along the conveyor from the capper or sealer. In its most elementary form, the back forms a reflector, in front of which we have a series of electric lamps, with a ground glass screen at the front. The operator seats herself opposite the device and examines the vessels, three or four of which are illuminated simultaneously, as they come along the conveyor. A more elaborate type of panel uses fluorescent light and a diffuser behind the containers, with a very large magnifying glass in front of them. In another variant, a section of the conveyor is tunnelled, a short zone of the tunnel at the front of the vessels being cut away, or sometimes fitted with a magnifier. In this type of inspector, the older plan is to use a horizontal beam of light from behind, but in some experimental types light from above and below is employed.

Some Weak Points in Inspection

The weak points of inspection of containers in this way as they pass along the conveyor are:

(i) The guard rails of the conveyor tend to obstruct vision. This may be overcome by removing a portion of them at the inspection point.

(ii) Even without guard rails, there is a tendency for certain types of matter to remain unseen on the bottom.

(iii) Specks are usually stationary, as there has been no preliminary shake up of contents, and are therefore more difficult to detect.

(iv) As no manual effort is required, inspection becomes very monotonous, and the attention of the operator may wane. Short spells of duty are therefore essential.

(v) In many cases, eye-strain quickly interferes with efficiency. Many luminous panels have a brightness of from 70 to 150 times that of the container, which can be most fatiguing.

The first three objections might be overcome by more or less simple mechanical means. Thus, if the potential demand justified it, the design of an automatically-fed small rotary with central luminous panel, the blocks being fed by star wheel in the ordinary way, but incorporating a bottle-rotating mechanism, would not be difficult. This would enable the entire container to be inspected free from obstruction, while any specks, unless firmly adhering to the vessel, would be set in motion. The container could be braked, as in the electronic device, just before inspection, or the rotation could be slowed down to give an all-round view of the vessel. Further, by using transparent seats, upward beams could be employed in addition to the horizontal lighting.

Reducing Eye Strain

Some experimentation has been undertaken in respect of reducing optic fatigue. Thus, high efficiency coloured discharge lamps have made it practicable to employ tinted luminous screens, the actual colour of light selected depending on colour of product and of vessel. Combinations of direct and diffused light have also been used, and 30-inch panels using a bank of four projector flood lamps with special reflecting devices to direct half of their beams into the containers are said to give good results. Unlike the case of the hand-fed box, in which it is a simple matter to mask off practically all light not passing through the container, the panel's extraneous light is the usual source of eye strain. As the containers are moving, it is impracticable to employ masking, and the only practical approach is to use the minimum intensity necessary, and have the panel of the minimum vertical height.

In the author's view, quality of illumination is more important than mere intensity, and must be studied in relation to the colour of ware and product. To illustrate this, it is a fact that one large cider bottler has found that for the inspection of dark green vessels nothing is superior to ordinary candles! Whether or not a magnifying glass is essential to competent final inspection is a moot point. Most American processors say "Yes"; most British "No." The author's experiments lead him to think that a clear flint lens increases eye strain so materially that it is more of a hindrance than anything else, but if a slightly tinted lens, along Crookes lines, is employed, both efficiency and freedom from rapid fatigue are enhanced.

Accumulating Tables

Accumulating tables are either stationary or rotating. Some of the former are very large, but for small cylindrical containers, the more usual

form is a small rectangle with tapering sides to the conveyor discharge, the rotating type being circular.

Lighting may be downward, oblique, horizontal or from below. The most favoured method in the case of the very large stationary table is downward; one very efficient plan being to use two or more long tubular fluorescent lamps of about 80 watts each, placed laterally about three feet over the table, downward-reflecting troughs giving a uniform illumination of good quality and suitable intensity (usually from 30 to 60 f.cs.). Downward lighting is also used for the smaller stationary or rotating types, while horizontal panels have also been employed, but oblique lighting is claimed to be superior, on the grounds that a cross-lighting effect helps to reveal small particles. However, so far as inspection while the vessels are stationary on the table goes, upward lighting from below the accumulator is superior. Instead of the usual stainless, Monel or nickel top, the table is fitted with a stout opal or ground glass screen which allows virtually glareless light to pass through. Bottom sediment is then vividly revealed. A variant of this is to use downward diffused or fluorescent lighting, and employ a white porcelain enamelled table top. By this means one gets reflected light from the table passing through the lower part of the ware and contents. As to oblique lighting, the most efficient method is to place a large reflector, with two or three, say, 40 watt fluorescent lamps, about two feet or so above the top of the containers on the conveyor, at a point about two feet from the actual accumulating table. The beam is directed towards the table. This is usually found more comfortable from the operator's viewpoint than direct downward illumination.

One advantage of the accumulator table method is that the inspector also packs the containers into trays or cases. The manual effort has a tonic effect and assists in "keeping the inspector awake."

Seal Detectors and Laboratory Inspectors

A number of simple but ingenious devices, chiefly American, have been used to detect any containers which have missed being capped. Thus, in one instance, a projection arm operates an electrical relay. If an uncapped container passes, a trip mechanism comes into play and the whole unit stops. Leak detectors are chiefly of two types. For still products, some form of "tumbling" mechanism, which carries the vessels for a short period on their sides, is employed. For products containing high-pressure CO_2, etc., immersion is used. In the automatic system, the goods from the production conveyor are passed by a special conveyor, usually on their sides, through a water-trough. To avoid subsequent label-sweating, this is usually followed by conveyance through a hot-air drying tunnel.

Laboratory inspection *per se* is beyond the scope of this article. Cross-lighting inspectors, however, fall into the "no man's land" between routine inspection and full laboratory inspection. With certain products they are invaluable. Thus, any bright liquid which contains colloidal matters may appear perfect when viewed in the ordinary way, but may on standing develop haze, etc., by agglutination. One device for checking on this point consists of a dark chamber to hold the sample product in its container. An electrical lamp and lens throw a strong beam through part of the contents. An adjustable eyepiece arranged so that the line of vision is oblique to the beam gives the viewer an elementary kind of ultra-microscopic view, any suspended or coarse colloidal matters being revealed by light reflection. Routine checks of this kind give the processor a key to the efficiency of his filtration system.

Clean Container Inspection

At the outset it was said that many processors considered clean container inspection to be more essential than final inspection. To the author's knowledge no photo-cell device has yet been used for this purpose. The most usual methods are:

(*a*) Hand "sighting."
(*b*) Hand-fed inspection box.
(*c*) Luminous panel devices operated in conjunction with the production conveyor between cleaner discharge and filler feed.

There is general agreement that, when operating hand-type washers, hand sighting against a clear northern light gives excellent results. The operator either packs the sighted vessels into trays, or places them on a production conveyor or rotating table feeding the filler. The snags are variation of natural lighting intensity, and difficulty of orienting the plant so that the lighting is suitable. Hence, in many instances, artificial lighting is preferred. The author's own preference is for downward reflection of adequate fluorescent light of the "cold" type, the lamps and reflector being situated directly over the rinser. This keeps the inspector out of the direct beam himself, yet gives maximum uniform illumination of the vessels as they come to him on the rinser.

The other two devices and their variants have already been described when treating of final inspection. The inspection box, in this case, is sometimes placed in the centre of a rotating table, the box itself being non-rotating. The operator takes the vessels from the rinser, views them in the box, then places them on the table, which is being continuously rotated towards the filling operator, who removes them to feed his machine. With auto-

matic systems, the two chiefly favoured plans are (i) troughed fluorescent lamps either in line with the production conveyor or placed laterally at intervals over it, about two feet above the top of the containers; or (ii) a luminous panel placed behind the bottles, as they come along the conveyor, with or without a magnifying lens in front. Variation of colour of bulbs or diffusing screen, and variation of lighting intensities for different products and ware is frequently suggested, but blanket recommendations are unhelpful. For flint, however, a slight green tinge has been found restful, while a bluish light is frequently advised for amber. Moving beams have also been experimented with, but appear to distract rather than otherwise, the obviously better approach, but more difficult technically, being slow rotation of the vessels. In one unit, vessels from the washer are slowly brought from an inverted to an upright position, and in this case a panel at that point has been found most effective, but in the majority of automatic unit designs the vessels must be sighted in upright position, which has the disadvantage of possible obscuration of the lower part of the vessel. White enamelling of the conveyor links has been experimented with, but has its limitations, and a panel giving a slightly downward reflection is a more practicable approach.

Dirty Empties Inspection

The objects of dirty empties inspection are:

(i) detection of extra foul, *e.g.* paraffin contaminated, vessels;

(ii) rejection of any cracked, sealing-rim-defective, etc., ware;

(iii) segregation of wrong shapes, sizes, branded ware belonging to other packers;

(iv) detection of any abnormal foreign matter. Arrestment at this initial stage is obviously the most economical procedure, and the first step towards prevention of unsuitable ware passing to consumers.

In some factories, however, this important task is merely left to the worker feeding the cleaner. If there is plenty of time this may be permissible, but even then the task should be systematised. Using high-speed loaders, the operators find their attention divided, and faulty ware is frequently passed through. An American device known as a "bottle picker" is helpful at this point. Consisting of a multiple fork apparatus, the operator lifts six to twelve vessels from the case, and places them on the cleaner loading mechanism. Now, if there is suitable illumination—say, trough reflection of fluorescent light of sufficient intensity at the point—the operator can hold the vessels in the picker in such a manner that most defects are revealed, yet have adequate time to feed the cleaner.

Unfortunately, this does not get over the paraffin problem, whose presence in vessels is usually more easily detected by smell. In several factories the dirty empties are loaded on to a slat or narrow band conveyor, the inspector being seated so that she can actually sniff as well as "sight" the vessels. Most of these materials, however, do not smell strongly until wetted or warmed, and the practice of one firm has therefore much to commend it. A rinser-drainer conveyor is placed between the sorting point and washer feed. The rinse water is warm, and the inspectors at the take-off point examine the containers for odour as well as visible defects before feeding them to the cleaner-loading device.

Physical and Psychological Factors

It is generally agreed that comparatively short spells of duty on inspection work are best. There are two general methods, frequent rest periods and rotation of duty. In either case, a spell of about one hour at a time is considered best. In the rotation method, each member of each production team takes his or her turn at "sighting." In the rest method, the inspector gets a definite period of rest after each spell of duty.

The first appears very attractive, especially to the small packer; but it has two serious disadvantages—dislocation of responsibility, and the fact that every worker is neither a born sighter nor can necessarily be trained to become an efficient inspector. The rest method is best adapted to factories where several production lines are used. A team of inspectors can then be kept available, one doing relieving work entirely.

Bonus systems are used by many firms, but are capable of great abuse, unless well thought out beforehand. Thus, quite a common system is to pay inspectors according to the number of rejects. Not only does this involve additional work in checking rejects by a foreman or other responsible person, but positively invites operators to fake containers and products. A much better plan is to pay a fixed bonus sum per week or month to all inspectors, so long as no returns which can be directly traced to faulty inspection occur. When returns do occur there is a suitable deduction from the bonus. If this is to operate on an individual basis, this means label keying, etc., to place responsibility, which is difficult, but most firms find that allocation according to inspectorial teams brings good results. If the team suspects one member of slacking, his life is not a happy one.

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of any books on scientific and technical subjects which authors might care to submit.

XIth International Congress of Pure and Applied Chemistry

ABSTRACTS OF PAPERS

CHEMISTRY IN RELATION TO FOOD AND NUTRITION

Summary of Introductory Remarks

A. NEUBERGER

THE two most outstanding advances during the last twenty years in our knowledge of the metabolism and nutrition of proteins are probably the discovery of threonine by Rose and the isotope experiments of Schoenheimer and Rittenberg. The isolation of threonine completed the list of amino acids which are essential for growth in the rat, and made it possible to conduct feeding experiments with pure amino-acid mixtures. The use of labelled elements revealed the extraordinary speed with which the nitrogen in the proteins of many tissues is exchanged with the nitrogen supplied in the diet.

The formation of protein depends as to whether all essential amino acids are supplied in the optimal amounts in the diet. A lack of any of these essential metabolites will inhibit formation of proteins, and thus inhibit growth. It can therefore be expected that a specific lesion and a change in the relative composition of the body will only occur if an essential amino acid is the precursor of a component of tissues which is not incorporated in proteins.

However, deficiency of protein in the diet may lead to certain metabolic disturbances such as alcaptonuria. This point has recently been investigated in some detail, and new information has been obtained as to the intermediate metabolism of aromatic amino acids.

Observations on the Amino-Aldehyde Reaction in the Deterioration of Stored Foods, with Particular Reference to Milk Powder

C. H. LEA

(*The Low Temperature Station for Research in Biochemistry and Biophysics, Cambridge*)

J. C. D. WHITE

(*The Hannah Dairy Research Institute, Kirkhill, Ayr*)

The reaction between the free amino groups of protein or of amino acids and reducing sugar plays a considerable part in the deterioration of a variety of stored foods. In milk powder the reaction, which has been followed by determination of free amino nitrogen and of combined sugar, has been shown to proceed rapidly at high moisture content and particularly at high storage temperatures. The temperature coefficient is high, and the reaction is largely inhibited at low moisture content. The relations between the amino-sugar reaction and the development of "off" flavour in air and inert gas and discoloration, loss of solubility, increase in reducing power, absorption of oxygen, and production of carbon dioxide were discussed. The protein of deteriorated powder is found to be of reduced biological value, the deficiency being largely made good by the addition of lysine. Microbiological assay of essential amino acids indicates that part of the lysine is present in a form less available to enzymic than to acid hydrolysis. Experiments on artificial protein-sugar systems were briefly described, and reference made to the reaction in several other food systems.

Nutritional Rehabilitation : Lessons from the Minnesota Experiment

ANCEL KEYS

(*Laboratory of Physiological Hygiene, University of Minnesota, U.S.A.*)

The Minnesota Starvation Experiment involved a controlled study on thirty-two young men during three months of normal nutrition, six months of semi-starvation during which they lost 24 per cent. of their body weights, three months of restricted refeeding, and ten months on unlimited diets. Activity approximated that of light industry at all times. The basic diet was of the European famine type, mainly whole grains, potatoes, turnips, and cabbage. In rehabilitation, a factorial design with paired groups and sub-groups of subjects allowed evaluation of the effects of calories, extra proteins, and extra vitamins. Analysis of the changes in the major body components—water, fat, bone, and "active" tissue—was made.

In rehabilitation the changes in body, water, and fat obscure the evaluation of "active" tissue recovery from gross weight alone. In general, functional recovery paralleled the recovery of "active" tissue. Under the most favourable conditions, full recovery required from six to twelve months. Supplementary vitamins and proteins were not im-

portant, but caloric intake was critical. Intakes over 4,000 Calories daily promoted most rapid weight recovery, but the added weight was mostly fat and there was relative obesity. At intakes less than 3,000 Calories daily the recovery rate was very slow. These men required 3,200 Calories for balance before starvation and about 1,700 Calories at the end of starvation. With very high intakes (over 5,000 Calories) in recovery, there were tendencies toward congestive heart failure.

The Depolymerisation of the Starch Macromolecules

CHARLES H. F. FULLER

Depolymerisation is defined in its application to starch. The various physical and chemical means of effecting depolymerisation are described. Methods of following the extent of depolymerisation were discussed under the headings of (1) methods of general application to high polymers and (2) methods specific for starch.

The results of depolymerisation by grinding in a ball mill are given, together with their bearing on the structure of the starch components, amylose and amylopectin.

Vitamins in West Indian Diets

L. LALOO DANIEL

(*On Staff Department of Agriculture, Government of Trinidad*)

A short description of the vitamins present in various diets which are used by different racial groups inhabiting the British West Indian Islands. The prevalent custom for the preparation of some of their foods. Observations in their manufacture of certain articles of diet in which vitamins and essential elements for human nutrition are destroyed or wasted. Noticeable effects of vitamin deficiency among the people, and suggestions for improvement.

The Determination of Folic Acid

MURIEL MEIKLEJOHN

This paper is a modification of Tepley and Elvehjem's* method for the microbiological assay of folic acid.

Folic acid is an essential growth factor for *Streptococcus faecalis*, and the rate of growth of the organism, as measured by the production of titratable acid, is proportional to the amount of folic acid present in a medium otherwise nutritionally complete. Sub-culturing *Streptococcus faecalis*, as recommended by Tepley and Elvehjem on yeast glucose agar stabs, does not maintain the organism in a suitable form for the assay of folic acid. In order to keep *Streptococcus faecalis* in a suitable state of metabolic activity, it is necessary to make weekly transfers from liver tryptone agar to liver tryptone broth, incubate eighteen to twenty-four hours at 30° C., and to make a transfer from the broth to slope of liver tryptone agar and incubate for eighteen to twenty-four hours at 30° C. This culture is kept in the refrigerator until required. The composition of the liver tryptone agar and broth is that of Nymon, Gunsalus, and Gortner.*

Comparisons are shown between the response of *Streptococcus faecalis* to folic acid after eighteen hours' incubation sub-cultured on yeast glucose agar and sub-cultured through liver tryptone broth and slopes.

Comparisons are shown between the response of *Streptococcus faecalis* to folic acid cultured on yeast glucose agar after eighteen, forty-eight, and seventy-two hours' growth.

Comparisons are made between the response to folic acid of *Streptococcus faecalis* when cultured on liver tryptone broth and agar after eighteen, forty-eight, and seventy-two hours.

Using the method described above, a good response is obtained to synthetic folic acid prepared in the Lederle Laboratories.

* Tepley, L. J., and Elvehjem, C. A., *J. Biol. Chem.*, 1945, **157**, 303.

Injury and its Effect on Protein Metabolism

D. P. CUTHBERTSON

Traumatic injury of a moderate or severe character leads to a marked catabolism of body protein as revealed by the loss of nitrogen (mainly as urea) and sulphur (mainly as inorganic sulphate) in the urine during the first ten days or so following injury.

So far there is no clear indication which tissue or tissues suffer most depletion. The ratio of the N:S "lost" in the urine is suggestive of muscle as being the source of the protein catabolised. But the loss is greater than can be accounted for by losses adjacent to the site of injury. The liver might have been suspected had not the amount of nitrogen lost in the first ten days following an injury, such as the fracture of a long bone, been some three to four times that of the nitrogen content of the whole liver.

It may be that all tissues share to some extent in this catabolic phenomenon, their degree of depletion being inversely related to their importance in maintaining life in the injured organism.

Anabolic stimulants such as crude alkaline extract of the anterior pituitary gland prevent this marked loss of nitrogen which follows injury, but

* Nymon, Gunsalus, and Gortner, *Science*, 1945, **102**, 125.

whether it does so in virtue of inducing anabolic changes at another site and quantitatively opposite to those induced by the catabolic phase, or whether the catabolic phase is eliminated, is as yet impossible to state.

Experiments are under way to determine the main site of this catabolism.

The Sulphur Amino Acids in Nutrition

L. E. GLYNN

The sulphur amino acids are essential for the nutrition of the mammal. Some of the requirements for these acids can be met by cystine or cysteine, others only by methionine.

Methionine may be considered as functioning in three ways—as a source of utilisable organic sulphur, as a source of labile methyl groups, and as a whole molecule. As a source of utilisable sulphur, it is required for the maintenance of normal hepatic function and structure, and in this role it is completely replaceable by cystine. Thus, rats on a diet poor in all the sulphur amino acids rapidly develop massive necrosis of the liver, which is preventable by either cystine or methionine. As a source of labile methyl groups, its place cannot, of course, be taken by cystine. The lipotropic, antiperotic, and anti-kidney-haemorrhage activities of methionine are a function of this group, but to a large extent the body's requirements may be met from other sources, such as choline and betaine. Since, however, cystine plus choline cannot entirely replace methionine in the diet of rats, it is apparent that methionine is something more than a source of utilisable sulphur and labile methyl groups.

How can we know whether our Food is doing us Good?

J. R. MARRACK

Our supply of food will be selected deliberately for many years to come. We shall need to assess the well-being of the community as far as it may be affected by food. (*a*) To decide whether the food supply is well selected, and (*b*) to satisfy the public that their food is good for them. For (*b*) it will be essential that the tests used should be such as will be regarded by the public as real tests of their health and efficiency.

The tests that may be used are:

1. *Vital Statistics.*—The objection raised to these is that people may be under par for a long time without dying; also that death rates are affected by new remedies such as sulphonamides and penicillin.
2. *Surveys of Morbidity.*—Open to the objection that the results depend on the memory of the subjects.
3. *Clinical Examinations,* which are much influenced by personal factors and always held to be worthless by those who do not approve of the results
4. *Heights and Weights of Children.*—Probably the best criterion.
5. *Functional Tests.*—Results liable to be affected by the attitude of examiner and examinees.
6. *Laboratory Tests.*—Some, such as the level of haemoglobin, may be appreciated by the public. Others, such as the level of ascorbic acid in blood, mean nothing to them.

These tests should be carried out at regular intervals on representative samples of the population, preferably together with surveys of food eaten.

The relation of the results of various tests to food supply was discussed, and need for further investigation of the effects of diet on health was stressed.

Use of Extracted Pancreas as a Protein Source in Nutritional Experiments

JOHS. GLAVIND

As a source of protein for experimental animals in nutritional investigations, casein has, for certain purposes, the disadvantage that it seems to be difficult to extract the last traces of vitamins from it.

Instead of casein the author has tried to use pancreas, which, as a by-product from insulin production, can be obtained rather easily in fairly large amounts as a uniform product from which most of the water-soluble vitamins have already been removed. When this product has been dried, extracted with fat solvent, dried again, and ground, a yellowish-white powder is obtained. This preparation has been used through several years as a protein source in experimental diets for the routine standardisation of vitamins K, E, and A with uniformly good results with respect to growth of the animals, depletion period, and response to dosage of all three vitamins.

The Role of Proteolysis in Bread Dough

E. ELION

(*Technical Representations, Inc., Washington, D.C.*)

The action of small quantities of certain oxidising and reducing agents on the properties of bread dough has previously been explained by a direct or indirect inhibition resp. activation of the flour proteinases (proteolytic enzyme theory). Much experimental evidence in favour of this theory is available. Some authors, however, are in favour of a theory of some direct action of oxidising and reducing agents on the flour proteins. The present author has previously shown that several objections to the proteolytic enzyme theory cannot stand a critical examination and that their basic experiments in fact support this theory. In the present paper the author reviews some other recent objections raised against the proteolytic enzyme theory, and, supported by old and new experimental evidence, he shows that none of the papers reviewed constitutes any objections to this theory.

Determination and Control of Flavour in Foodstuffs

HUGH C. MOIR

Flavour is defined to include taste, odour, texture, etc., and may be inherent or added as spices or essences. The importance of regularity of flavour in factory production is stressed and methods of assessment and control are discussed. It is shown that chemical control is of limited value and that the final assay is still organoleptic. This may be performed by single specialised tasters, as in the cases of tea and whisky, or by a tasting panel. The factors to be considered in the selection and size of a tasting panel and its management are reviewed. The methods of presentation of samples, their number, and the collection and interpretation of results are considered as well as the possibility of a "Panel of Appeal."

Chemical Methods for Estimation of Vitamins

LESLIE J. HARRIS, L. W. MAPSON, E. KODICEK, T. MOORE and V. H. BOOTH

This paper consists of a critical survey of the reliability and sources of error in the chemical methods, the conclusions being checked by biological assays.

1. *Ascorbic acid.* Provided the proper precautions were taken in the technique (*e.g.* an appropriate extraction procedure to inactivate enzymes and retard oxidation; and a rapidly performed titration in acid reaction to exclude reduction by glutathione, etc.), chemical determinations by the indophenol-titration method, on numerous fruits and vegetables (raw, canned, or boiled), agreed with the results of biological assay (growth, tooth section). Tests for presence of interfering substances (*e.g.* by comparison of velocity constants) gave negative findings almost without exception. No evidence was found of "bound ascorbic acid," nor were there appreciable amounts of dehydro-ascorbic acid in most natural products. Certain processed foodstuffs (*viz.* caramelised and fermented preparations) may contain interfering substances ("reductones," etc.). Two methods have been developed for the quantitative differentiation of ascorbic acid from such interfering substances in caramelised dehydrated foods, (*a*) by comparing their rates of condensation with formaldehyde or (*b*) by measuring the rates of reaction (continuous-flow apparatus); results again were checked biologically. For pigmented extracts, a potentiometric method is used, and in presence of SO_2 a modified technique using acetone, or "degassing." The occurrence of non-specific reductants in urine does not affect the validity of the loading-test technique for determining human nutritional status.

2. *Aneurin: thiochrome test.* Attention was given to such points of technique as (*a*) the need for adequate digestion, (*b*) removal of interfering substances, by washing with isobutanol, (*c*) rapid oxidation in presence of methanol followed by treatment with H_2O_2, (*d*) clarification with EtOH, (4) provision of an appropriate blank. Results by the improved procedure were in agreement with biological assays (over seventy comparisons being made, using bradycardia, convulsions, or growth tests).

3. *Riboflavin: nicotinic acid and amide.* Similarly, various possible sources of error in technique were investigated with special attention to (*a*) complete extraction and digestion, (*b*) removal of interfering substances, and (*c*) optimum conditions of test procedure. Chemical results agreed well with microbiological assays.

4. *Vitamin A.* (*a*) In U.-V. spectrophotometry it is sometimes necessary to eliminate irrelevant absorption by saponification or other means, and to ensure that absorption at 328 mμ is actually due to vitamin A. (*b*) In the $SbCl_3$ method, unsaturated acid and other substances which reduce the blue colour must be removed; carotenoids must also be removed or a correction applied.

Carotene. Necessary conditions include rapid sampling and extraction into cold solvent. Saponification is unnecessary if a satisfactory adsorbent is used. Extraction with petrol-acetone, purification on a stable mixture of aluminium oxide + sodium sulphate, give reliable results and speed.

5. *Vitamin E.* In the $FeCl_3$-$\chi\chi$-dipyridyl method, interfering substances must be removed, *e.g.* by adsorption or alumina.

The "H"-Lactation-Promoting Factor

MOHAMED EI SHAHAT

(*M.Pharm.[Chem.]; D. Biochem [Faculty of Medicine], Fouad 1st, University, Cairo, Egypt*)

Part I—Isolation and Properties

1. A new fat-soluble lactation-promoting factor was isolated from the unsaponifiable matter of Fenugreek oil (Arabic: *Holba*), after being freed from phospholipides and sterols by partition, chromatography, and p-nitrobenzoylation.

2. It exists in needles, m.p. 137° C., contains one OH (p-nitrobenzoate m.p. 151° C.), and has an absorption band with a maximum at 305 mu; $E^{1\%}_{1\,cm.} = 58$ (in cyclohexane).

3. It is thermostable and unoxidisable by alcoholic $AgNO_3$.

4. It is active in doses of 0·05 mg./Kg. body-weight of rats.

5. It has been proved biologically, spectrographically, and chemically not to be a tocopherol.

Part II—Effect of Human Lactation

1. *Effect on volume of milk.* The "H" factor promoted lactation in 345 out of 350 cases of human lactation deficiency at a dose equivalent to $\frac{1}{8}$ mg. orally. The volume of milk increased in 158 cases at different stages of lactation by 160 per cent. to 900 per cent., the larger increase being at the earlier stages of lactation. Of these cases, ten had twins and six failed to improve by prolactin or polyvitamin treatment.

2. *Effect on main constituents of milk.* The percentage of fat determined in twelve cases was found to increase by 10 per cent. to 20 per cent. The total daily output of T.S. increased by 30 gm. to 48·4 gm., that of fat by 10·2 gm. to 13·8 gm., proteins by 3·22 gm. to 6·58 gm., lactose by 15·8 gm. to 28·6 gm., and minerals by 0·43 gm. to 0·8 gm.

3. *Effect on vitamin content of milk.* The percentage of vitamins determined in nine cases showed an increase in vitamin A by 4 I.U. to 20 I.U./100 c.c. of milk. The total daily output of vitamin A increased by 525 I.U. to 1,497 I.U.; B_1 by 0·032 mg. to 0·071 mg.; B_2 by 0·084 mg. to 0·1,785 mg.; C by 18 mg. to 27 mg.; PP-factor by 0·294 mg. to 0·736 mg./100 c.c. of milk.

Thus, both the quantity of milk and its nutritive value are increased after the administration of the "H"-Lactation-Promoting Factor.

Nutrition and Disease in Early Life

A. N. WORDEN

The complex and varied relationship of nutrition to disease is well illustrated in the early life of different species. In the case of the ruminant, it may be shown that conception, uterine development (with permanent after-effects in survivors), maternal morbidity, parturition, birth weight, birth vigour, tissue reserves at birth, lactation and resistance to infectious (usually manifested as enteric) disease in the new-born are all profoundly influenced by trophic factors.

Enteric disease (an expression of systemic infection) is of comparative significance. Studies on lambs and calves indicate the importance of colostrum in species with a syndesmo-chorial placenta. They provide also valuable experimental material for the investigation of antibody production and the influence thereon of nutritional status. Owing to the variable resistance of different calves (possibly a breed difference) to colostrum deprivation, it is possible to rear calves that have an incomplete serum globulin picture, but are capable of producing antibodies to defined stimuli.

Results with calves justify more intensive studies. They suggest also that it would be well worth while to reinvestigate the role of breast milk (including colostrum) in disease resistance in the human child.

Water Pollution and Food Supplies

THE suggestion that British rivers are being polluted to such an extent that all life in some of them is being exterminated, contained in a report issued by the British Field Sports Society, is aimed primarily to safeguard sporting interests, but it also reveals the grave threat to freshwater and estuary fish—valuable sources of our food supply. Salmon still contribute to this, and British rivers are capable of producing 6,000 tons of this fish for human consumption every year. In one year Billingsgate Market alone has sold over 700 tons of British-caught salmon.

The report cites by name several river estuaries where pollution, chiefly by domestic sewage, has caused a ban on the sale of shellfish for human food, or they require special treatment. The Welsh Dee is an example of the former and the Lancashire Lune of the latter.

Salmon River Pollution

Food factories and industrial works are often to blame for the pollution of salmon rivers. There are many more examples of food losses than the report gives. The filthy, poisonous trail of pollution, which increased in our rivers during the wartime industrial liberties, can have a more widespread effect than most town folk and industrialists appreciate. In 1927 nearly 6½ tons of dead salmon —827 fish in all—were taken out of the Dee—killed by pollution. In 1931 pollution of the Calder, a tributory of the Ribble, closed the spawning beds. On July 12, 1932, thousands of salmon and sea-trout were polluted by flood water from this river entering the big river, and the main run of sea-trout was believed to have failed to reach the upper waters. In 1930 there was a similar calamity. The Mersey was once one of the country's biggest salmon fisheries, and even in this century its estuary had its own shrimping fleet at Eastham and another fishing fleet at Rock Ferry, but now it is probably the most polluted river in the world with over 40,000,000 tons of crude sewage a day and no fishery.

Tees salmon smolts migrating to the sea in spring were found dead from the cyanides of coke oven effluents; with the use of lime and spent pickle liquor these effluents could have been converted into less toxic ferrocyanide before tipping into the river. A great deal of the destructive river pollution comes from silk works, milk factories, sugar-beet works, canning factories, ensilage waste from farms, and domestic sewage.

Effluents from Canning Factories

Those canning factories that do not already do so should screen suspended solids from their wastes or filter them on to land first. The use of lime, or in some cases lime and ferric chloride, will encourage settling and sludge formation in the screened wastes from tomato, red beet, and other canning wastes. Tomato waste, for example, is so acid that it requires 1 lb. of lime per 500 gallons before going through the filter bed. A cheap percolating filter enables waste water from milk industries and sugar beet to be used again and thus reduce milk waste pollution by 99 per cent.; activated sludge methods would reduce the pollution by 97 per cent. Better care of domestic sewage would also help. The modern alteration of the Penrith sewage works considerably improved the pollution position of the Eden salmon fisheries.

The effect of an immediate check on river pollution, by which the yield of salmon rivers would be increased even by 1 per cent., would add 50 tons of salmon to the national larder—equivalent to an entirely new salmon river.

Food Research

RESULTS of experiments carried out on behalf of the Ministry of Agriculture on the production of alternative feedingstuffs for dairy cattle and poultry are among those contained in the Annual Report (1946) of the Ovaltine Research Laboratories. Potatoes unfit for human consumption have been fed to cattle and poultry, and in order to maintain supplies of dairy produce, other alternative feedingstuffs are being studied.

Enriching Milk Supplies

Results of experiments made to supplement supplies of milk for infants show that the mixture of protein in a combination of malt extract, wheat flour and soya flour, in which about 70 per cent. of the total solids and about 30 per cent. of the total protein is obtained from malt extract, has a growth promoting power for young rats equal to that of the protein of milk, and if used for baby food would not need supplementation with food yeast or synthetic B vitamins. These important findings are being tested by clinical trials on babies and young children in the Dortmund area of Germany.

Closely bound up with the above work were experiments on the growth promoting vitamin riboflavin in cereals, particularly barley, and the effect of malting and brewing processes on this. A report of these experiments was given to the British Pharmaceutical Conference in July, 1946, both fluorimetric and microbiological methods being employed. They showed wide variations in the riboflavin content of commercial malt extract. These variations, taken in conjunction with those previously observed for the content of other B vitamins and of protein in commercial malt extract, show how important it is that in manufacturing infant and invalid foods containing malt extract the processes should be controlled to ensure the highest possible content of these factors.

Recent reports show that nicotinic acid is present in the best malt extracts in sufficiently high concentration to make good any deficiency likely to occur in the diet. Unlike riboflavin, there is little, if any, increase in the total nicotinic acid content during malting of barley and manufacture of malt extract. Further investigations in the laboratories have shown that with some other cereals, notably oats and rice, germination can cause marked increases in the nicotinic acid content.

The problem of quenching thiochrome fluorescence by interfering substances in malt extract, causing fluorimetric results to be too low, has received particular attention, and has been approached from a new angle, using absorption methods to remove quenching substances. These experiments have already given quite promising results.

Vitamin Values

Investigation into vitamin C in tomatoes and the distribution of this vitamin in different parts of the fruit, and how it is affected by sunshine, enzymes, and other factors during growth and ripening, has demonstrated that while the degree of exposure to sunshine seemed important, the average vitamin C concentration in fruit grown under glass did not sufficiently differ from that in fruit grown out-of-doors.

Experiments show that variations of several hundred per cent. may occur in the vitamin value of staple foods, and search for possible causes of this variation in vitamin value formed an important part of nutritional research.

Detailed study of the results of the work on the clinical assay of vitamin P has disclosed some interesting facts about the therapeutic and physiological action of this vitamin. Its effect on any given individual has been clearly shown to depend on the initial vitamin P status as measured by the capillary resistance (C.R.). A similar relationship between effect and initial status has been found by other workers with insulin and with vitamin D. The effect of each of these, like that of vitamin P, can be measured by a test which is fairly specific for its physiological action, in contrast with the general growth response used for other vitamins.

Emulsions and their Application in the Bakery

R. L. KENNY, B.Sc., F.R.I.C.

The nature of emulsions, factors affecting their formation, and how the principles of emulsion formation may be applied to foodstuffs in general and to the bakery trade in particular.

AN emulsion is a system containing two liquid phases, one of which is dispersed as globules in the other. The liquid which is broken up into globules or droplets is called the dispersed phase, and the surrounding liquid is known as the continuous medium.

Usually the two liquids are an oil and an aqueous solution, and for the purposes where only foodstuffs are to be considered the oil will always be of an edible nature, and derived either from vegetable or animal origin.

It will be necessary to discuss in the first place the theory of emulsions before any appreciation of their application in the bakery can be visualised.

Two Types of Emulsion

For two given liquids it is possible to have:

(1) An oil in water emulsion
(2) A water in oil emulsion.

An oil in water emulsion is one in which the continuous (outside) phase is aqueous, while a water in oil emulsion is one in which the continuous phase consists of an oil. There are definite factors which determine the type of emulsion which is formed, and later reference will be made to these.

An emulsion is nearly always opaque, even when prepared with two transparent liquids, on account of differing refractive indices.

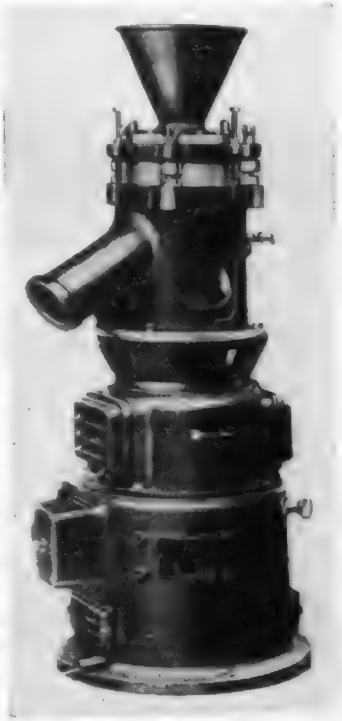
Emulsifying Agents

It is extremely difficult to form an emulsion of pure oil in water. This is due to the fact that when the two liquids are agitated, although the oil forms globules in the water, these are immediately reunited, and the liquids separate out into two layers. The addition of a third substance is therefore necessary to make the globules stable in the water phase, so that after agitation they do not show a tendency to amalgamate. This third substance is known as an emulsifying agent. It is very important to the mechanism of emulsion formation to know whether this emulsifying agent is water or oil soluble. In fact, both types do exist, and this property plays an important part in the preparation of an emulsion.

The emulsifying agent may be present naturally in a foodstuff, or it may be added as an extracted material. If one of the naturally occurring emulsifiers is present, then an emulsion is usually readily formed.

While there are numerous emulsifying agents available to the food industry, perhaps the most effective are glyceryl monostearate and its derivatives, sodium alginate and soya bean lecithin. In the case of the last named, it is interesting to note that the cruder the added lecithin, the better it behaves as an emulsifying agent.

Some of the emulsifiers are soluble in water, and others such as glyceryl monostearate are only soluble in oils or fat. Previous reference has been made to the fact that it is possible to form an emulsion either of water in oil or oil in water, and a certain amount of confusion might arise as to which type is formed when the addition of one liquid is made to the other. In most cases this is



A five-inch paste mill with direct-coupled motor.

a matter of choice, but having made the selection it is necessary to appreciate that there are many factors which influence the formation of the emulsion, and attention must be paid to each of these in its preparation, in order to achieve the desired result. While it is not possible to record all the factors affecting emulsion formation, the following will indicate the most important.

Type of Oil Used

It has been found that there is a marked difference in the efficiency of oils, dependent upon their nature. They might be divided into four classes, in order to illustrate this differentiation, but such classification can only be regarded as a useful guide.

1. Oils showing very good emulsion properties. In this could be placed animal fats, such as lard, and a few vegetable oils of which an example is rape oil.
2. Oils with average emulsifying properties. In this group may be included: Cocoa butter, butter-fat, groundnut oil, sesame oil.
3. Oils possessing poor emulsifying properties. In this group may be included: Coconut oil, palm kernel, soya bean oil, beef tallow.
4. Oils showing very poor emulsifying properties. It includes a number of hydrogenated oils.

It is an interesting fact to record that hydrogenation of an oil generally reduces its emulsifying properties.

Selective Solubility of the Emulsifier

If the emulsifying agent is soluble in water there is a greater tendency, all other things being equal, to form an oil in water emulsion, and *vice versa*. An emulsifier which is soluble in fats is glyceryl monostearate, and examples of those which are soluble in water are methyl cellulose, gum tragacanth, gum arabic and albumen. It is interesting to note that egg yolk contains two natural emulsifying agents, cholesterol and lecithin. Cholesterol tends to assist the formation of water in oil emulsions and lecithin works in the opposite direction, showing a preference for the formation of an oil in water emulsion. It follows, therefore, that in using egg yolk it is possible to form an emulsion in either direction as desired, provided that strict adherence to other conditions is maintained.

Type of Agitation

In general, the higher the speed of agitation, the better the emulsion, but it must be remembered that slight oxidation can occur if too much air is introduced. It is considered that an intermittent stirring action is more successful than a continuous operation, but in practice this is very rarely carried out. An increase in viscosity of the liquids also assists emulsion formation.

Temperature of Liquids Added

In order to prepare good emulsions in the bakery, the temperature of the two liquids when added should be as nearly equal as possible. It is difficult to suggest an ideal temperature, as this varies for every different type of emulsion formed.

There is a word of warning, however, which must be introduced here. When the emulsion has been formed, either by agitation or by homogenisation, it is necessary to cool it as rapidly as possible. Otherwise at high temperatures the emulsion tends to become unstable when agitation ceases, with resultant separation of the fat layer. This can be minimised by increasing the viscosity of the continuous phase through the addition of a stabiliser such as a gum or starch, so that movement of the fat globules is rendered less easy.

It is a known fact that there are specific emulsifiers for certain fats. In other words, one emulsifier which is quite suitable for emulsification of a vegetable oil might be completely unsatisfactory if added to an emulsion prepared with a mineral oil. With regard to concentration, it is generally accepted that the higher the concentration of the emulsifying agent, then the greater will be the effect of emulsification.

Interference from Salts and Electrolytes

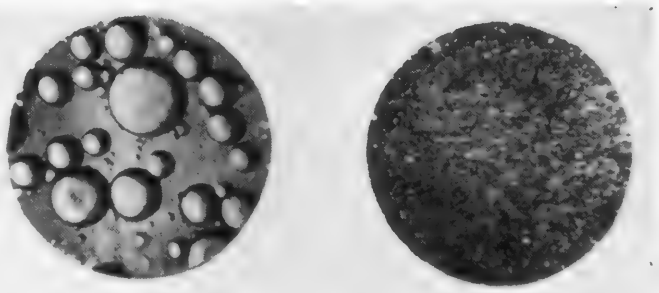
Mineral salts are frequently present in emulsions, and play a very important part in their stability. For example, hard water, which contains a proportion of dissolved salts, tends to form an emulsion of different stability from that produced with the aid of distilled water. It is not possible in this brief survey to indicate the action of each type of salt, but perhaps it will suffice to state that in general the addition of calcium chloride to an emulsion will tend to break it down completely, and therefore the presence of this salt in the aqueous phase should be avoided. Closely linked with these remarks must be the effect of *p*H, which is a measure of the acidity and alkalinity control. Most emulsions have an optimum acidity or alkalinity at which they exhibit maximum efficiency. Generally speaking, it is preferable to prepare an emulsion in a slightly acid or slightly alkaline solution than in a medium which is completely neutral, but generalisations of this nature are dangerous, as there are many exceptions. Almost every raw material used in the bakery possesses small traces of mineral salts and usually a mild acid or alkaline reaction. It is manifest, therefore, that the choice of recipe influences considerably the stability of the emulsion.

Method of Addition of One Liquid to the Other

The importance of this factor might best be illustrated by detailing a general method for the preparation of a water in oil emulsion, but it must

not be assumed that such a method is applicable for any type of emulsion or emulsifying agent. Obviously instances will be encountered where application of such methods would not produce the desired results.

The fat is placed in a mixing bowl and the emulsifier dissolved in it. The temperature of the mix is raised as high as practicable. The aqueous phase should be as near as possible to the temperature of the fat and should be added slowly with constant vigorous stirring. After the initial emulsion is formed the aqueous phase may be added more rapidly.



Emulsion Prepared by Mechanical Stirring.

Same Emulsion after Homogenisation.

In order to prepare an oil in water emulsion the same procedure is adopted, except that the aqueous phase is placed in the bowl and the fat added slowly.

More complex emulsions are possible, consisting mainly of dual emulsions of oil in water and water in oil phases, but their preparation is too specialised to fall within the scope of this present discussion.

Ascertaining the Types of Emulsion Formed

An emulsion can only be diluted with the continuous phase. As an example, if water is added to an emulsion, and the latter is an oil in water type, it will mix readily. If it should be a water in oil type, then two separate layers will be formed.

A second method of identification may be carried out by dusting a little oil-soluble dyestuff over the surface of the emulsion, when it will spread in the case of a water in oil emulsion. Similarly, the addition of a water-soluble dye will only show spreading should the water phase be on the outside. A further means of differentiation may be obtained by introducing two electrodes into the emulsion. Little or no current will flow if the oil phase is continuous because of the high resistance set up by the insulating phase.

Two Simple Types of Emulsion

So far attention has only been drawn to theoretical considerations, but a study of the practical application of each type of simple emulsion in foodstuff is now necessary.

While a water in oil emulsion has probably its greatest application in the use of cosmetics, nevertheless it does play an important part in the preparation of edible emulsions. In view of the fact that oil forms the outer phase, this emulsion has a capacity for remaining moist. Further, its lubrication value is good, since the oil is distributed over a larger external surface area than would otherwise have been possible by the use of the same quantity of fat alone. As a result such an emulsion is very effectively used as a fat extender in the greasing of bakery receptacles. It is not suggested, of course, that it is more effective than the fat alone, but it is possible to utilise a limited quantity of raw materials to greater advantage.

It has been emphasised that the efficiency and degree to which emulsions are prepared can be controlled by application of the principles outlined above. Complications, however, arise in complex mixes where soluble solids such as sugar may be present in the water phase in addition to insoluble solids. Often the presence of such constituents reverses the conclusions that one would tend to expect.

Oil in water emulsions are more frequently encountered in the food industry. Every cake batter containing eggs is an emulsion of this type, and the various processes which are employed in the mixing of cake batters produce emulsions of varying stability and globule size. The question of emulsion formation is not the only one to be considered in such a complex problem. The texture and consistency of the fat and the type of flour employed are also essential factors necessitating separate consideration.

Nevertheless, the principles of emulsion formation in such mixes can influence the final result to a large extent, and it is necessary that the mechanism should be fully understood. In the preparation of cake mixes, whether they be prepared by the flour batter or sugar batter method, one of the essentials should be to obtain a good emulsion. Sometimes this is not always achieved, as is illustrated by the phenomenon encountered when a batter curdles as a result of the addition of eggs either too quickly or at too low a temperature. Should the emulsion break down in this manner, it is always essential to melt the fat before the emulsion can be reformed.

Perhaps at this stage a few words concerning the best-known natural emulsions which form part of the human diet might be appropriate. Butter is a

natural emulsion of oil and water. It possesses extremely good emulsifying properties and the texture of the fat is suitable for creaming purposes. For both these reasons, therefore, it is considered ideal for the preparation of cakes. Perhaps, however, the most important natural emulsion of oil and water is provided by the yolk of eggs, where the egg oil is emulsified by the presence of naturally occurring lecithin and cholesterol. In most cake batters it supplies all the emulsifying agent required for the mix. As the large amount of protein which is present in the white of egg tends to stabilise the emulsion once it is formed, the addition of whole egg to a cake batter becomes indispensable, particularly in view of the fact that most of the enrichening and levigating properties necessary for satisfactory cake production may also be derived from the same source.

A third example of a naturally occurring oil in water emulsion is provided by milk. In this particular case we have approximately 30 parts of water emulsified with one part of fat, and therefore there is a large dispersing phase in which the fat may distribute itself. The fact that this phase consists of butter-fat guarantees the efficiency of the emulsion, and on homogenisation it is possible to reduce the size of the fat globules down to very minute limits.

Although the question of emulsification in cake batters is of general application, it has been particularly studied in recent years with reference to the production of high-ratio cakes. The success of this type of product has been due primarily to the development of special fats with high emulsifying properties. By careful control of the partial hydrogenation process it was possible to produce a texture and smoothness allied to lard. When such fats were utilised for cake-making, the more complete emulsification of the fats which ensued permitted a higher proportion of water to be held in the mix. This in turn allowed a larger quantity of sugar to be dissolved in the batter, thereby producing a cake of higher ratio. In this connexion it should also be observed that the increase in the quantity of eggs added, besides assisting emulsification of the batter, also supplied surplus lecithin which was absorbed at the interface of the fat globules, producing a cake with better bloom and texture.

Emulsion Method of Cake Making

A method of cake-making, dependent upon emulsion technique, has been suggested in recent years. The principle involved lies in the preparation of a perfect oil and water emulsion before addition of the flour. This is achieved by mechanical mixing and subsequently passing the mix through an homogeniser. The method depends upon mixing the eggs, fats and milk together. These mixed ingredients are then passed through an homogeniser at specific temperatures and permitted to cool. The sugar is then dissolved in, and lastly the flour and the baking powder added to the emulsion while beating.

There are many, however, who hold the view that, while this may be a suitable method for the production of cheap cakes made with fats which have not been previously made into homogenised emulsions, it has no advantage over the more established methods for the production of good quality cakes made with emulsified fats. In other words, it is contended that better results may be obtained by using fats which have previously been efficiently emulsified and homogenised than by using this type of method, and one hesitates to make any recommendation as to the advantages of such a technique.

It is probably, however, in the field of bakers' sundry materials that the future of emulsion technique will develop to the greatest extent.

Homogenisation

So far examples of emulsions have been given utilising stirrers as mechanical aids. While this is in fact the most simple mode of operation, the size of dispersed globules differs in diameter, some being quite large and others very small.

There are, however, other means available which are more efficient, but which require the use of more complicated machinery. While it is not possible to give a comprehensive survey of every type, the field can be narrowed considerably by consideration only of the use of homogenisers and colloid mills. There are several types available, but the fundamental principles in each case are the same.

Homogenisation is a process which subsequently reduces these globules to approximately an equal diameter, many times smaller than the globules previously obtained in the emulsion, and the resulting product is called an homogenised emulsion. The main principle involved in an homogeniser is the forcing of the emulsion under pressure through an homogenising valve, which takes the form of two ground surfaces, seating accurately as a drop and lift valve. The emulsion is forced into the homogeniser at a pressure varying between 1,000 and 5,000 lb. per sq. inch, and the valve through which it must pass is gauged with a strong spring which permits a valve clearance of only a few thousandths of an inch. The seating and unseating of the valve takes place with great frequency, so that the emulsion passes through the narrow section with high velocity, and great shearing action is effected. The coil spring is so designed that any operation permits adjustment of the homogeniser pressure, which is shown on a high pressure gauge. Homogenisation might therefore be described as

(*Continued on page 420*)

A Varied Menu

Of the making of miscellanies and anthologies there seems no end where the literary world is concerned. But in that literature dealing with food and drink one should hardly find mere repetitions of miscellanea; for in face of rationing and shortages writers and speakers are ready enough to add to the storehouse of experiences, to scourge the memory, and cause gastric juices to flow by telling of great feasting in the past, or to sharpen their wit instead of the carving knife in references to austerity sausage, dried eggs, or a scanty meal served with a full enough cover charge.

A recent miscellany* is refreshing in virtue of variety and contrast offered under different heads. It is served up as a diversion, by looking to the past, from austerity, from those Food Facts and Flashes provided so liberally by a Ministry hard put to it to provide anything more substantial. Much of the matter is of British extraction, with some seasoning from the classical Greek-Roman periods and from French kitchens, without which condiments no book on eating and drinking can well be written.

As text the author gives that maxim of Thackeray that "next to eating good dinners, a healthy man with a benevolent turn of mind must like, I think, to read about them." The author gives us the best food first—but not a surfeit, as in some miscellanies. The opening chapter on good eating occupies only 18 out of some 200 pages. And by good eating is meant big eating where Parson Woodforde is concerned, who not only had his "calves' heads, veal, Pigg's face, lamb," to say nothing of "spring chickens and asparagus, a fine swan rosted with Currant Jelly Sauce for first course," as mentioned in one extract, but took to sirloins of beef, leg of mutton and "plenty of plumb puddings" on other occasions.

An equally short section recalls the Epicure's Almanack of 1815, a directory for either "a man with a delicate stomach and full purse, or for one with a strong stomach and lean purse." Then comes as varied a feast as could be wished for: courses are in no definite order, since this is a diversion and not something to satisfy "a long felt want." If you want austerity to go with today you may ride with Cobbett from Devizes to Highworth with no breakfast at all; you may lunch with Thackeray's Papworthy on a crust of bread and a glass of beer—"I'll only *lunch*, Poppins," he remarks, thus reminding us of pre-Victorian times before the Prince Consort, of days when luncheon was but "a mild midday refection." If you like a sardonic touch there is George Saintsbury's condemnation of sausages so rarely suggesting real pork. And should you relish an authentic touch from history's notebook, something seemingly insignificant at the time but now appreciated at its full worth, then re-read John Evelyn's paragraph from his Diary where he describes his visit to the Royal Society supper prepared in "Monsieur Papin's Digesters."

Eating in fiction and fact fills the pages of this book. Among "Strange or Unpleasant Meals" one dines with Gulliver in Lilliput and Brobdingnag, accompanies Alice to the Mad Hatter's tea-party, or joins the gentleman who writes to *The Times* on the eating of grass. The book is for the deck-chair or lounge, one in which to find entertainment in those odd periods when the mind will not take to hard reading. If you read the same paragraph two or three times in indiscriminate page-turning, what of it? Whether it is Johnson's "Meditation on a Pudding," Nicholas Nickleby's meal with Mr. Squeers, or Meredith's Dr. Middleton discoursing on port, you will find rich entertainment.—M. S.

* *Eating and Drinking.* By Madge Hart. London. Pp. 232. Price 15s.

A New Soya Bean Product

Novel soya bean products which whip more rapidly and to greater volume than either egg white or gelatin for use in the manufacture of marshmallows, nougat meringues, and meringue powders were the subject of a paper given by Dr. Ralph M. Bohn at the seventh national conference of the Institute of Food Technologists, U.S.A.

Dr. Bohn described the essential processes by which soya beans were converted into whipping agents, starting with extraction of the oil from flaked or ground soya bean, extraction of the protein, and the partial hydrolysis which turned the protein into an effective whipping agent.

Properly made, this product would perform the most difficult beating job of all, the manufacture of candy mazettas and frappes. Mazetta is a stiff foam of sugar, water, and a whipping agent which is added to cream centres, fudge, and other candy mixes to introduce air and control sugar crystallisation.

Although these derivatives from the soya bean have opened up a new field in the production of foam-producing materials, Dr. Bohn stressed that a number of technical difficulties still remained to be overcome. In view of the use of these materials in the candy and biscuit industries, there would undoubtedly be further developments with the ultimate production of a series of foam-producing agents to fit any possible need.

World Grain Reserves

It is now possible to make some estimate of the food prospects in the Far East. They are important not only in themselves, but because of the possible drain they may imply upon the world's grain reserves. The general disturbance in China has been intensified by serious flooding, especially in Kwantung, where more than 60 per cent. of the early rice crop of the Canton Delta has probably been ruined. China cannot rely on her usual pre-war shipments of rice from Indo-China. The fighting in that area has apparently curtailed the cultivated acreage by 40 per cent. or more; and it is now reckoned that the crop is not likely to suffice for more than the needs of the native population. Shipments to China will at best reach a few thousand tons.

Japan's food deficit is reported as the worst in her history. Her stocks are very low, owing greatly to the failure of the procurement measures taken by the authorities; they are stated to be no more than 20 per cent. of the 1941 level. This deficit is not likely to be overcome in the foreseeable future; the most optimistic estimate assumes that it will continue with greater or lesser severity until 1951. Report has it that the rations of the urban consumer will be lowered to about 1,100 Calories.

Meanwhile there is a slight symptom of recovery in the food shipments from Burma to India, though there are also signs that this recovery is accompanied by an increase in rice smuggling. India herself seems to be entering upon one of her periods of chronic emergency. The grain situation in the north is distinctly precarious. Large imports are required, and the fighting in Indonesia has probably deprived the country of much of the rice she had been expecting from that source. The general estimate of India's grain import requirements for the three months ending at the close of August has been for 1½ million tons; it is doubtful whether she will receive more than a third of this amount. In mid-July a relatively small shipment of 65,000 tons of wheat was announced from Australia; and it is evident that the Indian Government is anxious to increase these deliveries over the coming year.

The prospect for 1950-51 under favourable conditions hopes for a 2½ million tons rice export from Burma and a somewhat smaller surplus in Siam and Indo-China together. But the Indian deficit at that period will be, by all estimates, one of at least 2½ million tons. By 1954 the world exportable rice surplus may have increased to just under 7 million tons. But the gap will still remain significant. It may reach a figure of at least 3 million tons. The Rice Study Group initiated by FAO in Trivandrum has recommended an intensified effort to concentrate on irrigation and drainage. It further urged an examination of the different strains of rice and a selection of the more suitable fertilisers for delivery to the monsoon areas.

It seems probable, indeed, from an examination of the figures that the Far East will be in the market for grain for the next five years or more, and that the minimum demand from the large wheat areas cannot be less than 2 or 3 million tons a year.

Emulsions and their Application in the Bakery

(*Continued from page* 418)

due to pronounced shearing caused by high-velocity flow through the valve, effecting subdivision of the globules by impact on the wall of the valve head.

A phenomenon which has frequently been encountered with homogenisation is that of clustering of the globules. These clusters may themselves contain up to several hundreds of globules. This is particularly noticeable when homogenisation is effected at high pressure. Such clustering leads to creaming or separation of an emulsion, and it is desirable to destroy it. This is sometimes effected by the employment of two-stage homogenisation, during which the emulsion is homogenised at a high pressure, and passes directly to a further valve, which is operating at a considerably lower pressure.

Homogenisation tends to produce a great increase in viscosity of an emulsion, due to the absorption of an emulsifying agent at the water and oil interface, and experience has proved that a second homogenisation tends to reduce this viscosity.

While there are several designs on the market, the basic principle consists in passing an emulsion between two steel plates, one which is fixed called the stator, and the other which rotates at very high speed known as the rotor. A shearing effect is produced which disrupts the globules. There is an adjustable gap between the two. The rotor can be run at a high speed of approximately 9,000 revolutions per minute, and the dispersion occurs within the liquid medium while passing between the two plates. The degree of dispersion or the efficiency of the emulsion depends upon two factors, namely clearance between two plates, and the speed. The smaller the clearance and the higher the speed, the greater the disruptive force and subsequent dispersion. The passing of an emulsion through a colloid mill after it has been prepared by methods previously outlined has a beneficial effect and reduces the size of the particles. The disruptive or shearing force can equally be applied to a true emulsion or to a colloidal solution where one of the phases is represented by solid particles in suspension. This type of machine produces extremely smooth pastes as well as a satisfactory emulsion, and has a general utility application in foodstuffs.

Society of Chemical Industry

THE FOOD GROUP TOUR, 1947

Members of the Food Group of the Society of Chemical Industry outside the Gruyère cheese store at Bulle.

A party of about sixty members of the Food Group left Victoria for Switzerland on June 14.

The real business of the tour started promptly on Monday when the Group went to Bulle, the centre of the Gruyère cheese district, where a visit was made to a village factory. Thirty-five kilo cheese are made from half-fat milk, the cream being used for the local Vacherin cream cheese. The cheese are salted by soaking in a brine bath and home-made rennet used. Empirical methods are employed throughout.

The next move was on to Broc to visit the Usines Cailler S.A., or, more familiarly, the Nestlé Chocolate factory. It was a fascinating experience, not untouched with melancholy, to see so much chocolate being made.

The following day the party went by lake steamer to visit the St. Prex fancy glass and bottle factory, which stands on the border of Lake Geneva, and thence to Geneva to inspect the Usines Randon S.A., which produces edible oils and fats from poppy seeds, whale, groundnut, and other oils. This factory had a fine electrical boiler, as well as one fired by oil.

The edible oil is hardened at one atmosphere pressure using 15 kilos of nickel to 50 kilos of oil. The nickel is used four times and then filtered off. The fat is finally cooled to 15° C. on a roller. No milk is used, but 0·6 to 1 part lecithin per 1,000 is added as an emulsifier. The final product contains 10 per cent. butter. The product is packed by a Kustner packing machine made from stainless steel and aluminium, and a pleasing square pack with sides two inches long is produced at the rate of 85 per minute.

Towards the end of the visit a morning was spent at Berne University, where the party inspected the electron microscope and latest cataphoresis apparatus. In the afternoon Liebefeld Agricultural Research Institute was visited and the chemical, bacteriological, veterinary, and bee research laboratories were inspected.

The Group went on to Steinholzli Brewery, which was started in 1844, and makes lager and unfermented fruit juices. To conclude the tour a farewell dinner was held at the Schweizerhof Hotel.

There was general agreement that the tour was a great success and the greatest credit and thanks are due to the organisers.

Dundee's Food Production

Dundee manufacturers will reduce the volume of cocoa products reaching the trade, according to Col. L. E. Hill, President of the Chamber of Commerce, who has told members that a 45 per cent. cut in cocoa beans would reduce the volume of block chocolate produced in the city. Production of preserves and marmalade, another important Dundee industry, would be good if present indications could be regarded as stable.

The manufacture of Gruyère cheese is one of the main Swiss industries. A picture of the original process.

A Hundred Years of British Chemistry

CHEMICAL SOCIETY'S EXHIBITION

A panel showing the various processes in the manufacture of margarine from the crushing of the oil seeds to texturating.

Illustrating 100 years of British chemistry, the opening of the exhibition at the Science Museum was the first official function in connexion with the celebration of the Chemical Society's Centenary. Organised by the Chemical Society, the XIth International Congress of Pure and Applied Chemistry, and the Department of Scientific and Industrial Research, the exhibition is divided into ten sections: the properties of gases; the solid state; colloid science and surface chemistry; liquids and solutions; chemical reactions; valency and atomic structure; inorganic chemistry; agricultural chemistry; organic chemistry and biochemistry; and analytical chemistry.

Exhibits illustrating terpene chemistry, the alkaloids and carbohydrates, original specimens of vitamin C, examples of the first synthesis of thyroxine, the original apparatus used for preparing vitamin D, are among the many examples of the genius of British organic chemists and biochemists.

Supporting the historical section is the Science Museum's own collection of industrial chemical models and appliances, and a selection of literature, including a number of British and foreign technical and scientific journals.

The exhibition will remain open until September 30.

Scotland's Strawberry Crop

The successful development of disease-immune strawberries in Scotland has been achieved after long experimental work at Auchincruive, near Ayr, where the West of Scotland Agricultural College and the Department of Agriculture for Scotland have a horticultural department.

The decline of strawberry cropping in the Clyde Valley as well as in other parts of Scotland originated largely from the incidence of Red Core disease, and further work has been undertaken in the strawberry seedling section to develop disease-immune varieties guaranteeing to the grower a level of quality and quantity which would make strawberries an economic crop.

The importance of the development lies in the hope that these new disease-immune types can be again planted extensively in the former strawberry growing areas, and that strawberry production can again become a major industry in the Clyde Valley.

The development of canning and jam manufacturing industries which already exist in this area would be stimulated by a continuing flow of disease-free berries.

Scientific Films

The importance of the use of the film in research is becoming more recognised. A great number of research films have been made and are being made, but it is difficult to obtain any information on these films which would be of greatest value to research workers. To help scientists in this matter the Scientific Film Association intends to catalogue research films and, if necessary, to arrange for their duplication.

Scientists should send any available information on record films to the Honorary Secretary, Scientific Film Association, 34, Soho Square, London, W.1. If possible the following information should be included: a short description of the experiment recorded; the date; the name of the research worker who made the film; the gauge and length; if copies of the original record are available; from whom the film is obtainable.

Quick Freezing at Lerwick

The Herring Industry Board is developing and expanding its quick freezing work at Lerwick this year and has already released some limited amounts of this season's frozen herring.

The bulk of the quick frozen herring, however, is intended for storage until mid-winter, when supplies of fresh herring will not be available.

According to the Board the amount frozen this year will be approximately double that handled last year. Similar work is also to be undertaken at Grimsby on a larger scale, while a few private firms are also making plans for the development of this work.

Insulated Rail Containers

Twenty heavily insulated containers for the conveyance of ice cream, quick frozen foods, dry ice, and pancreas are to be built by the Great Western Railway.

Dr. Bernard A. Keen

Assistant director of the Rothamsted Experimental Station, Dr. Bernard A. Keen has accepted the post of director of the new East African Agricultural and Forestry Research Organisation. At the invitation of the East African Governors' Conference, Dr. Keen has spent the last six months touring East Africa to examine agricultural problems and research needs.

Opening of New Irish Factory

Formerly used as a potato processing plant, the factory at Drumahoe, Derry, has been completely redesigned during the past thirteen months and was recently opened by George Borwick and Sons, Ltd., the baking powder manufacturers.

The factory at the present moment employs approximately fifty workers, but it is hoped that when the situation regarding both machinery and raw materials improves it will be possible to expand staff and production to a considerable extent.

International Organisation for Standardisation

The first meeting of the Council of the International Organisation for Standardisation (known as the I.S.O.) since the ratification of its constitution (which was drafted in London last October at a meeting of twenty-eight nations) was held in Zurich from June 17 to 20. The Council consists of the National Standards bodies of Australia, Belgium, Brazil, China, France, India, Norway, Switzerland, United Kingdom, U.S.A., U.S.S.R.

The Council appointed M. Henri St. Leger to be General Secretary, and his office will be situated in Geneva. The meetings were presided over by Mr. Howard Coonley of the U.S.A., who was elected President of I.S.O. in London last October. An extensive programme of technical work will be submitted to the standards organisations in the different countries for consideration.

The International Electrotechnical Commission (known as the I.E.C.), which was formed over forty years ago and has National Committees in twenty-three countries, also held a meeting of its Council under the chairmanship of its President, M. Emile Uytborck, of Belgium.

As a result of the joint meeting between the I.E.C. and the I.S.O. it was agreed to recommend to the constituent members of the I.E.C. that the I.E.C. should affiliate with the I.S.O.

At the meetings of the Council of the I.S.O. representatives from the International Labour Office, the United Nations Educational Scientific and Cultural Organisation, the International Organisation for Civil Aviation, the International Dairy Federation, and the International Federation for Documentation were invited to be present to discuss the question of collaboration between those organisations and the I.S.O., and steps to put this into effect were agreed upon. It was stressed, however, that the national standards organisations should get into touch with their own representatives on these bodies.

The Engineering and Marine Exhibition

PURIFIERS, VALVES, BELTINGS, AND LOW TEMPERATURE RESEARCH

A complete range of centrifugal oil purifiers for lubricating and fuel oil suitable for all classes of motor ships and turbine propelled vessels is exhibited by the Alfa-Laval Company, Ltd., at the Engineering and Marine Exhibition now taking place at Olympia, London.

A comprehensive range of flow sheets illustrating De Laval complete processes and applications for specialised industries, such as fruit juice manufacture, starch, vegetable and mineral oil refinery, and whale oil separation will be displayed.

*

In addition to the wide range of standard diaphragm valves used in the handling of air and water as well as the more difficult fluids, Saunders Valve Co., Ltd., will show some recent developments now in production. Among these will be the air-motor operated valve and the self-closing valve.

*

A wide selection of products is exhibited by J. H. Fenner and Co., Ltd., including the original Pitchline V-Belts, precision machined light V-Belt pulleys, special types of V-Belts, patented "Z" dressed woven beltings, leather beltings, accurately made mechanical leathers, and a new range of industrial tapes and webbings. Other exhibits on the stand will include a range of anti-vibration mountings and other rubber to metal bonded mechanical products.

*

A portable plant of new design for ultra-low temperature research is to be shown in operation on the stand of J. and E. Hall, Ltd.

It is believed that this is the first plant of this type to be produced and developed entirely in this country, and the only one in this or any other country in which the difficulties associated with automatic control at extremely low temperatures have been overcome and complete safety under all conditions automatically ensured.

For this plant, control gear of an entirely new type has been designed and developed by which automatic working is possible at temperatures down to −140° F. The lowest temperature which has yet been reached in the cooled space is −150° F.

Methyl Bromide Dangers

In view of the increased application of methyl bromide in the practice of pest control, often by operators without previous experience, a pamphlet has been issued by the Home Office to emphasise the risks, and to recommend the minimum precautionary measures to be taken in safeguarding against them.

Entitled *Fumigation with Methyl Bromide* the pamphlet stresses its high toxicity, and advises that it should therefore only be used by responsible and technically competent persons, who should have a working knowledge of the nature of the gas and of the precautions to be taken in its use.

Booklets Received

Published by the Goodyear Tyre and Rubber Co. (Great Britain), Ltd., is the first post-war issue of *The Goodyear News*. Among the articles in this issue are "Tyre Markets Today" and an illustrated story of tyres in war.

▪

Two new booklets, dealing with salads and packed meals, have been compiled by the Good Housekeeping Institute and published by The National Magazine Co., Ltd.

Salads All The Year Round contains recipes and suggestions on making the best possible use of the different vegetables and green food available from season to season. Advice is given on the best salad plants and their correct preparation and use, including the more unusual vegetables and herbs.

Instructions for making all kinds of sandwiches are contained in *Sandwiches and Packed Lunches*.

▪

A new edition of *Basic Road Statistics* has been published by the British Road Federation, who, in a foreword to the booklet, explain that it is issued in an attempt to bring some order into the confusion which arises from the use of conflicting road statistics, and with the object of providing a standard reference on all essential road matters.

OBITER DICTA

● Calories cause confusion to the average housewife. Although she knows a great deal about food, she would not know a calorie if she met one in the street.—*Mrs. Ayrton Gould, M.P.*

● The only time you can get some things is when the points value is about to go down. Irish stew went off points. Just before that I ordered one case and was sent six.—*Mrs. Moore at Luton Borough Court.*

● I rate this tea-drinking as a destroyer of health, an enfeebler of the frame, an engenderer of effeminacy and laziness, a debaucher of youth, and a maker of misery for old age.—*William Cobbett*, 1762-1835.

● What fools these men (the Government) are . . . don't they understand that a bit more brightness in the lives of the people would do more for production than all the sermons of Shinwell and Cripps. — *Rev. A. W. G. Duffield, vicar of St. John's, Chester.*

● Why pamper good-for-nothing lazy hussies by canning potatoes? It is downright criminal to allow man-power to be used this way just because women with more money than sense can't be bothered even to peel potatoes.—*Letter to the "Daily Mirror."*

● I give him (Lord Woolton) full credit for what he did during the war when he was Minister of Food, all the more pity that he has decided to turn himself into a third rate political charlatan, peddling his quack remedies.—*Mr. Michael Foot, M.P.*

● Sales management, as we in this country understand it, is no longer a process for controlling high-pressure selling. It is now a long-term policy of helping the consumer to find the product he or she needs at the right price and at the right time.—*Mr. H. W. Butcher, M.P.*

● I know round and rosy butchers who have retired in their prime to villas in Blackpool and Brighton. For the past seven years they have run their cars and dined and wined on the fat cheques they have received for being good boys and keeping out of the way.—*A Labour M.P.*

Brewers' Exhibition

For use in the handling, lifting, stacking, storing, and loading of heavy or awkward goods, the Coventry Climax Fork Trucks will be shown at the Brewers' Exhibition to be held at Olympia from October 27 to November 1.

Appointments and Resignations

Mr. Leslie Gamage, M.C., Joint Managing Director of the General Electric Co., Ltd., has been re-elected chairman of the British Export Trade Research Organisation for the ensuing year.

▪

Sir Percy Lister, of R. A. Lister and Co., Ltd., is succeeded as deputy chairman by Mr. John Ryan, M.C., of Metal Box Co., Ltd.

▪

Mr. Richard Metcalfe has retired from the position of managing director of Scribbans-Kemp (Halifax), Ltd., biscuit and cake manufacturers; he will continue as a director of the Halifax factory of this group.

▪

At a lunch given by Van den Berghs and Jurgens, Ltd., on July 8, it was announced that Mr. W. Mitchell, Divisional Manager for Manchester, was leaving shortly to take up the position of Sales Director of Birds Eye Foods, Ltd., an associated company in London manufacturing frosted foods.

▪

Mr. Leo Russell, O.B.E., T.D., has been appointed by the Council of the British Institute of Management as Director of the Institute. He will take up the appointment as soon as he is released from his present post at the Board of Trade, which will probably be in the early autumn.

Omission

In the list of guests at the dinner given by Mr. W. Leonard Hill to Sir Norman Nock on July 9, the name of Mr. F. Waddington, advertisement manager of FOOD MANUFACTURE, was inadvertently omitted.

New Scottish Food Factories

A limited number of new food factories are included in the 336 projects approved by the Board of Trade since the end of the war for industrial estates in Scotland.

Gray Dunn and Co., Ltd., are to build a factory at Thornliebank for the manufacture of biscuits, and the Grocer Supply Co., Ltd., a factory at Hillington for the manufacture of sauces and pickles. William Macdonald and Sons, Ltd., are to extend at Hillington with a biscuit factory, while in Dundee the new James Keiller and Sons, Ltd., factory is being pressed forward. Among the plants in operation, Jean MacGregor, Ltd., have an extension at Hillington. A new factory, privately financed but with Board of Trade approval, has also been put into operation by Thomson (Law), Ltd., of Carluke, for the manufacture of jams.

Presentation of Albert Medal

The Albert Medal of the Royal Society of Arts, which has been awarded this year to Sir Robert Robinson, P.R.S., "for his outstanding contributions to the advancement of organic chemistry," was presented to him on July 28 by Sir Harry Lindsay, chairman of the Council of the Society.

In acknowledging the presentation, Sir Robert recalled the fact that the Chemical Society, with which he was so closely connected and which had just celebrated its centenary, was originated in the Royal Society of Arts. He also mentioned that as a result of the 1851 Exhibition, for which the Society was also responsible, the Royal Commission was able to offer scholarships to students, and it was because he had gained one of these in his early days that he had embarked on an academic career instead of an industrial one.

Others present at the ceremony included Lady Robinson, Lady Lindsay, Professor C. S. Gibson, Professor E. C. Dodds, Sir Edward Crowe, Sir Frank Brown, Dame Caroline Haslett, Sir Thomas Dunlop, Sir Atul Chatterjee, Sir Ernest Pooley, and Sir Henry McMahon.

Cheese from Holland

At an informal ceremony at the London Provision Exchange, the first consignment of Dutch cheese consisting of more than 4,500 round Edam cream cheeses and nearly 6,000 of the larger Gouda type was announced. Guests had an opportunity of sampling these products.

Inspecting the first arrival of Edam cheese from Holland.

Among those present were the Agricultural Counsellor at the Royal Netherlands Embassy and Dr. Edith Summerskill, Parliamentary Secretary to the Minister of Food, who made a short speech.

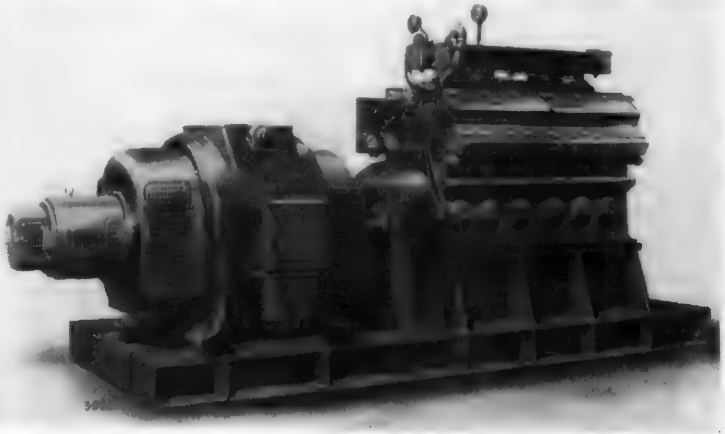
Stop Watches for Industrial Use

A wide range of stop watches in special standard patterns and also calibrated for special purposes is manufactured by Camerer Cuss and Company.

Packaging Materials

Further developments in wet-strength papers are among many improved packaging materials referred to in the May, 1947, issue of *Packaging Abstracts* published by the Printing and Allied Trades Research Association for the confidential information of members of its Packaging Division.

These include a bituminous emulsion which can be added to fibrous pulp as a sizing to produce a highly waterproof paper which, combined into a 3-ply paper board, lost wet strength only after thirty days' immersion. Other abstracts deal with uses in packaging of infra-red drying by gas, and pre-heating glass jars by infra-red lamps; new special-purpose designs of paper bags, cartons, and envelopes, with improved methods of packaging various kinds of foods, including live lobsters, turkeys, beef, and fruits and vegetables; and with the results of experimental and research work into the properties and testing of packages and packaging materials, including recent work on the resistance to grease and to water-vapour of packaging materials and package construction.



The largest of the diesel-alternator equipment manufactured by Davey, Paxman and Co., Ltd.

Institute of Packaging

TO FUNCTION AS PROFESSIONAL BODY

Discussions which have been going on during recent months between senior executives concerned with packaging have led to the formation of the Institute of Packaging, a body which aims to encourage the study of the most efficient methods of packaging in all its aspects, and to assist in all practical ways the development of packaging in the national interests.

An Inaugural General Meeting was held on July 24 in London, at which a report was given to members on the work already done, together with a short- and long-term programme of future activities.

The Institute proposes to hold conferences and meetings, arrange lectures and discussions, as frequently as conditions permit; and is also working on a long-term educational policy of the greatest importance to the future status of those concerned in the packaging and allied industries.

The Institute wishes to stress that it is not a trade or research association, and will not compete with or duplicate the valuable work which such associations are doing. It will function as a professional body, and hopes that through the contact of its members, who are drawn from every branch of packaging activity, it may act as an integrative factor among the varied interests concerned.

Analysis of the founder membership to date reveals that already a comprehensive representation has been achieved. Membership, which is confined to individuals, is representative of the following packaging activities and manufactures: board and paper making; carton and folding boxmaking; rigid boxmaking; closures; collapsible tubes; conveying and handling; corrugated fibre and solid fibre containers; design and display; glass containers; glueing and sealing methods; package machinery design and plant layout; printing; plastics; transparent cellulose and other films; transport, shipping, and packing for export; labelling; metal containers; wood boxes and cases; sealing and strapping.

Food Manufacturers' Overseas Expansion

To bid *bon voyage* to ten members of Marshall's Food Products, Ltd., a lunch was held at the Dorchester Hotel on July 19, Alderman S. H. Marshall, J.P., M.P., C.A., presiding.

Seven of the "pioneers" are sailing for East Africa, one to South Africa, one to Palestine, and one to Eire. The chairman, in his valedictory speech, proposed the toast of "Our Pioneers," and said that although the possibilities of expansion in the United Kingdom were not exhausted, the firm was extending its activities and a branch had been established near Nairobi. Further developments in Canada and Australia were also being contemplated.

The Commissioner for East Africa, Mr. Roger S. Norton, in seconding the toast, welcomed the young men to Kenya. The Kenya Government intended to develop secondary industries and there were numerous opportunities for firms and also individuals.

Other speakers were Mr. F. W. Harris, managing director, Mr. H. F. Martin for the visitors, Mr. A. H. Spicer, general manager, and Mr. R. D. Hutchings for the pioneers.

New Trade Association

The organisation hitherto known as the Food Machinery Industrial and Export Group has been transformed into a trade association to be known as the British Food Machinery Manufacturers' Association, with interests covering bakery and biscuit plant, brewing and mineral water machinery, canning machinery, chocolate and sugar confectionery machinery, dairy equipment, grain machinery, and miscellaneous food machinery.

The chairman of the new Association is Mr. E. H. Gilpin of Baker Perkins, Ltd., and the vice-chairman Dr. R. Seligman of the Aluminium Plant and Vessel Co., Ltd., while the director is Mr. Norman Neville, O.B.E., and the secretary Dr. E. H. T. Hoblyn, M.B.E., all of whom served the old Export Group in a similar capacity. The address remains unchanged at 26, Portland Place, W.1.

Mr. J. W. Belcher, Parliamentary Secretary to the Board of Trade, laying the foundation stone of the new factory of J. H. Fenner and Co., Ltd., at Hull.

More Traders to Visit Germany

As the result of improved facilities in Germany it will be possible for an increased number of business men to visit the joint U.K./U.S. Zones of Germany to buy goods and services. In future all applications to visit the U.K./U.S. Zones of Germany should be sent to the German Division, Board of Trade, I.C. House, Millbank, London, S.W.1, giving full details of the proposed transaction and itinerary.

Firms are reminded that trading with Germany is subject to the normal import licensing and exchange control regulations. Business men who wish to sign contracts in Germany are therefore advised to make sure before departure that the necessary import licences will be forthcoming.

Changes of Address

As from August 5, 1947, Crompton Parkinson, Ltd., will be occupying Astor House, Aldwych, London, W.C.2. The Electric Vehicle Division remains at Electra House, but as from August 5, the telephone number, telegraphic, and cable addresses will be the same as those for Astor House: Telephone No.: Chancery 3333; Telegrams: Crompark, Estrand, London; Cablegrams: Crompark, London.

▪

Having closed their war-time factory at High Wycombe, the whole production of Raynor and Co., Ltd., essence distillers and manufacturers of food products, has been moved back to the pre-war factory at Commercial Road, Edmonton, N.18, to which address all goods or communications should now be sent.

▪

The office address of H. S. Bottle Co., Ltd., is now 38, Haymarket, London, S.W., the warehouse remaining at 15A, Whitcomb Street, Haymarket.

Food Manufacture

Required to purchase back copies of FOOD MANUFACTURE for 1944, 1945, and January and February, 1946.

Shetland Industry Resumes Work

Work has been resumed in Shetland where, last year, the first co-ordinated scheme of quick freezing, cold storage, and transportation of herring was initiated on a large scale. Plans already announced anticipate the doubling of that capacity this year. The Herring Industry Board, which is responsible for this expansion, will this year double certain sections and will deal with 35 crans daily.

Last year the entire Shetland fleet of about fifty vessels earned between £150,000 and £160,000. This year a number of herring curing firms have made arrangements to receive the herring catch, and a number of kippering firms will be operated. An English klondyking firm last year purchased 100,000 quarter cran cases of herrings at 55s. per cran.

COMPANY NEWS

At the thirty-ninth annual general meeting of Argentine Estates of Bovril, Ltd., the chairman, Lord Luke, said that owing to the poor results in the year under review, no provision for taxation had been made. The net profit was insufficient to pay the Preference dividend for the year without drawing on the amount brought forward from last year's profit and loss account. The directors regretted that no dividend could be recommended for this year on the Preferred Ordinary shares, which had received 3 per cent. in each of the last four years.

▪

The forty-ninth ordinary general meeting and the adjourned forty-sixth, forty-seventh, and forty-eighth ordinary general meetings of Hovis, Ltd., were held recently in London, Mr. A. H. Dence, J.P., chairman, presiding. It was announced in a circulated statement that the company had been able to maintain the Ordinary dividend at the rate of 20 per cent. throughout the war and recommended a continuance of this rate.

▪

At the sixty-eighth annual general meeting of the Express Dairy Company, Ltd., Mr. W. A. Nell, chairman, presiding, it was announced that the directors had recommended a final dividend of 7½ per cent., tax free, to be paid on the Ordinary and "A" Ordinary stock, making, with the interim dividends, a total of 15½ per cent., tax free, for the fifteen months.

▪

The directors' report presented at the annual general meeting of Reckitt and Colman, Ltd., Mr. A. R. Cleminson, chairman of the company, presiding, stated that three interim dividends had been paid and a final dividend of 5 per cent. in respect of the year 1946, making 20 per cent. for the year, less income tax, was proposed.

▪

The directors of the Midland Bank, Ltd., announce an interim dividend for the half-year ended June 30 last at the rate of 8 per cent. actual, less income tax, which became payable on July 15. The same rate of dividend was declared a year ago.

▪

Speaking at the forty-seventh annual general meeting of Virol, Ltd., Lord Luke, the chairman, said that the directors recommended, after paying the Preference dividend and transferring £10,000 to reserve, against £5,000 last year, that the Ordinary shares receive a dividend of 15 per cent. and a bonus of 2½ per cent., less income tax.

▪

A final dividend of 20 per cent. and a cash bonus of 5 per cent., both less tax, making a total distribution of 32½ per cent. for the year, was declared at the eighteenth ordinary general meeting of Smith's Potato Crisps (1929), Ltd.

▪

At the adjourned ordinary general meeting of The East India Distilleries and Sugar Factories, Ltd., the chairman, Mr. H. R. Hobson, D.S.O., said that the Board recommended an increased dividend, bringing the total distribution up to 10 per cent. on the Preference shares and 17½ per cent. on the Ordinary shares.

OVERSEAS ITEMS

Cuba's Good Sugar Outlook

Among the world's major food shortages, sugar appears to show best hopes of a steady improvement in supplies. Cuba's 1947 sugar production established a high record at 6,450,000 short tons raw value, and it is possible that this figure may be repeated in 1948. Beneficial rains have already raised 1948 expectations by 500,000 short tons to 6,000,000, and a continuance of these rains would bring another 6,450,000 short ton total in sight. Still higher figures are talked of in Cuba, but are regarded as over-optimistic in New York.—*Reuter.*

Macaroni from Maize Flour

During the recent months a considerable quantity of maize reached Italy from abroad, and the Italian Government sought to press maize flour into service as a substitute for wheat, of which there was a shortage in the country. Apart from a few regions of Italy where porridge made of maize flour is eaten traditionally, the attempt failed, even when this flour was distributed as a partial substitute for the bread ration. As neither bread nor macaroni could be made from this flour, many Italians either did not collect their ration or fed the flour to their chickens.

This induced a Ligurian macaroni factory to attempt making macaroni from this unusual material. As the maize flour is not cohesive enough to form hard dough, numerous experiments had to be made. The work, however, was successful, and the new type of macaroni is now being sold in some Ligurian and Piedmontese provinces. The new product presents a pleasing appearance, cooks well, and its taste is good, and, if the traditional conservativeness of Italians in the matter of food can be overcome, it may spread to other regions of the country. In the meantime it is interesting to note that the new macaroni prices are quoted in the black market practically at the same level as the usual ones.

U.S. Agency for Food Supplies

The U.S. is considering the creation of an International Purchasing and Delivery Agency for handling grain food and other supplies to be delivered to Europe under the Marshall plan. A proposal for such an agency was first put forward by the U.S. Secretary of Agriculture, Mr. Clinton Anderson, after his recent trip to Europe.

The agency would be a completely new one, separate from the proposed International Trade Organisation or any other existing United Nations bodies.—*Reuter.*

Tushonka for Russia

Tushonka, a specially prepared Russian product consisting chiefly of pork, makes up a much larger part of meat exports from the U.S.A. this year than last. Exports of this product were discontinued last October, but resumed in February.

The movement of all meat out of the country during the early part of the year was well below the quantities moved in the corresponding part of last year, but exports of the Russian item decreased much less than shipments of other meats. The U.S. for several years has been a large producer of this special canned meat for Russia, sending out a total of 80,188,000 lb. in 1946, and 166,659,000 lb. in 1945.

Col. Bradley Dewey

In recognition of his outstanding services to the United States as Deputy Rubber Director from September, 1942, to September, 1943, and as Rubber Director from September, 1943, to September, 1944, and for his services as chairman of the Guided Missiles Committee of the Joint Chiefs of Staff from February, 1945, until May, 1946, Colonel Bradley Dewey, President of the Dewey and Almy Chemical Company, U.S.A., has been awarded the Medal of Merit. The ceremony took place at the U.S. Naval Shipyard, Charleston, Mass., and the presentation was made by Rear-Admiral Morton L. Deyo, commandant of the First Naval District, on behalf of the Secretary of the Navy.

Essential Spice Oils

Under the registered trade name "Spiceal" the Essential Oils and Aromatic Chemicals Division of S. B. Penick and Company of New York, are supplying a full line of essential spice oils readily dissolved to a clear solution with water, oil, or alcohol media for the seasoning of foods.

Kenya's Coffee Industry

The coffee industry of Kenya has now recovered from the ill-effects of the war and from years of drought and is looking forward to a prosperous future, according to the Acting Governor, Sir Gilbert Rennie.

It was reported at the opening of the annual Coffee Conference held in Kenya that, with a crop estimate of about 12,000 tons, 1947-1948 prospects for the industry were brighter than for some years.—*Reuter.*

Food from Yugoslavia

Officials in the Yugoslav Republic of Croatia have stated that if the good weather continued, Yugoslavia should be able to export food to Britain and other countries by the end of the year. Among such exports would be fattened pigs, processed fats, and some dairy products. Last year, on the other hand, Yugoslavia was compelled to sell several thousand lean pigs to Switzerland for lack of fodder for them at home.

U.S. Meat Allocations

The U.S. Department of Agriculture have announced the allocation of 2,000,000 lb. of meat to Britain and U.K. forces overseas in the third quarter of this year. Another 643,000 lb. were allocated to the British Dominions, Colonies, and Protectorates.

Total allocations for the July-September period for export totalled 16,876,000 lb., which is only about one-third of 1 per cent. of more than 4,900,000,000 lb. that are expected to be produced in the U.S. in the same period. It compares with 153,000,000 lb. exported in the second quarter of 1947.—*Reuter.*

More Dried Eggs for Britain

Britain has just signed a new contract with the U.S. Department of Agriculture to buy 5,264,000 lb. of dried eggs. It is understood that negotiations under way envisage the signing of an additional contract to buy an undisclosed amount of frozen eggs, mainly for baking and other manufacturing purposes. The latest dried egg contract is in addition to one for 33,000,000 lb. already contracted for this year. —*Reuter.*

Chappie's Eire Factory

A canning factory, which will utilise the valuable meat protein, serums, and gland extracts capable of being produced from horses in the preparation of balanced animal foods, is to be erected in Clonmel, Eire.

The enterprise sponsored by the Department of Agriculture, Eire, and promoted by Chappie (Ireland), Ltd., will give specialised attention to by-products for use in the medical field and to the correct feeding of dogs.

An offshoot of an English concern, the promoting company also has links with factories in America.

American Horse Processing Plant

Nothing is wasted in the Nebraska Packing Company's horse-slaughtering and processing plant which opened in North Platte in July, the usual by-products as in cattle processing being elaborated.

The plant is the only one of its kind in Nebraska and one of approximately 85 in America.

Although the main market for human consumption of horse meat lies in Europe, the manager of the plant believes the market will increase in America. The meat will be Government inspected, and retailers in Nebraska will comply with State laws.

Approximately 100 horses providing some 30,000 lb. of meat will be processed in the plant each day. About two-thirds of this weight will be for human consumption, the remainder for cats and dogs.

Northern Ireland Fishing Industry

DEVELOPMENTS DURING WAR YEARS

Prior to the outbreak of war, the bulk of Northern Ireland fish, both sea and inland, was marketed in Great Britain and an even higher proportion of the fish consumed in Northern Ireland was imported from Great Britain. The way in which the consuming public became much more dependent on locally caught fish has been told in a report on Sea and Inland Fisheries, 1942-1944, which has just been published by the Ministry of Commerce. The report (price 1s.) is on sale at H.M. Stationery Office and booksellers. As no figures of production could be published during the war owing to the statistical "black-out," this Report includes tables for the six-year period 1939-1944.

The development which took place in the Northern Ireland fishing industry during the years under review is indicated by the fact that herring catches in 1944 totalled 50,895 cwt. as compared with 39,467 cwt. in 1938, while whiting catches rose from 17,061 cwt. in 1938 to 64,619 cwt. in 1944. The total value of fish (excluding salmon) landed on the coast in 1944 was £258,427.

Taking all fish into account, the quantities of sea fish in 1944 increased to approximately double pre-war figures. The total number of fishing boats in Northern Ireland was 508 in 1944, a decrease of 51 boats compared with 1938. Motor boats, however, increased from 314 to 338 in this period, and vessels solely engaged in fishing increased from 109 to 149 in 1944. The number of men employed in sea fishing increased from 898 to 1,031, of which latter figure 555 were whole-time, the highest number to be so engaged since the year 1930. The chief factor in this increase in the number of fishermen was the main County Down fleet, which increased from 45 vessels in 1938 to 56 in 1944.

The Report states that the scheme of loans and conditional grants authorised in 1941, combined with greatly increased earnings by fishermen, gave the necessary incentive for the replacement of older craft by vessels of modern design. By the end of 1944 a substantial number of new craft, designed for herring fishing and Seine netting, was either in commission or under construction in spite of war-time shortages. In the three years covered by the Report, loans exceeding £24,000 were advanced by the Ministry.

Reference is made to the fact that in several hatcheries artificial propagation of salmon was carried out. The year 1943 was the best pollan season in Lough Neagh since 1927. High prices in cross-Channel markets greatly helped to stimulate the activities of the fresh-water fishermen. On account of the scarcity of fish in Great Britain considerable impetus was given to the capture of coarse fish in rivers and lakes in Northern Ireland. In the Lough Erne district alone the total exports of coarse fish in 1944 increased to almost 100 tons.

Oil from Maize

Recent complex regulations concerning maize, which were issued by the High Food Commissioner in Italy, have attracted the attention of the public to the fact that to supplement the deficiency of olive oil a certain quantity of alimentary oil is extracted from maize in that country.

As maize is already subjected to control in Italy, and as the best oil is obtained from fresh shoots, it has become necessary to make additional regulations to enable farmers to secure permission to assign certain quantities of maize to oil extraction. To encourage this branch of activity, the Commissioner has fixed the wholesale price of maize oil at the same level as that of the olive oil.

Two processes are used for extracting oil—presses and solvents. Solvents give a better yield (120 kilogrammes of crude oil per ton) as compared to presses (90 kilogrammes per ton). The oil thus obtained is not suitable for human consumption and has to be refined. Crude oil yields about 82 per cent. of pure oil.

MINISTRY NEWS

Illicit Slaughter

In 1943 every butcher was warned by the Minister of Food of the serious consequences which might befall any trader who was convicted of illicit slaughter of livestock. An improvement followed this warning, but the Minister of Food is concerned at the extent to which illicit slaughter still continues. This offence deprives the nation as a whole, for the benefit of a few, of some of the home-killed meat to which it is entitled, and the Minister has accordingly issued a further warning that any trader found guilty either of illicit slaughter or of possessing or disposing of meat or bacon not received from a lawful source, is liable to have his licence revoked.

Kippered Herrings in Cellulose

Authorisation has been granted for the sale of kippered herrings wrapped in Cellophane, at prices exceeding by 1½d. per lb. the maximum prices prescribed at each stage of sale for kippered herrings in Part III of the First Schedule of the Fish (Control and Maximum Prices) Order, 1946, as amended.

Kipperers wishing to take advantage of this should apply for a licence to Fish Division, Ministry of Food, Carlton Hotel, Pall Mall, London, S.W.1. Licences, which will also cover later stages of sale, will be valid for two months in the first instance. It will be a condition of the issue of a licence that the name and address of the kipperer or his registered brand or trade mark shall appear on each wrapped package of kippers or on a label or slip enclosed with or attached thereto.

Kippers wrapped in Cellophane are pre-packed food, and must accordingly comply with the labelling requirements of the Labelling of Food Order, No. 2169 of 1946. Packers who wish for advice on the requirements of this Order should apply to the Food Standards and Labelling Division of the Ministry of Food, forwarding three samples of the label which they propose to use.

Vitamin Claims for Butter

From October 1, 1947, manufacturers will be permitted to claim on labels and advertisements that butter is a natural source of vitamin A without being required to give a quantitative statement of its vitamin A content. The necessary amendment to Article 5 of the Labelling of Food Order, 1946, will be made in due course, the object of the present announcement being to give all sections of the trade adequate notice of the proposed change.

Nut Kernels

An Order revoking the Nuts Order, 1945, and entitled the Nut Kernels Order, 1947, came into force on July 27 and prescribes increased maximum wholesale and retail prices for nut kernels, and also increased allowances for processing. The increases are necessitated in both cases by higher costs, the distribution of nut kernels being still restricted to manufacturers and *bona fide* vegetarians. A separate announcement will be made shortly about future arrangements for nuts in shell.

Edith and the Whale

Verses composed by Miss Susanne Knowles, secretary to Dr. Edith Summerskill, referring to the occasion on which the Ministry of Food's Parliamentary Secretary cooked whale meat for her family. Master Summerskill came back for a second helping:

When Cleopatra gave a feast
She offered to her man
A precious pearl dissolved in wine
And ptolemaic ptarmigan.
Yet she, with dark dismay,
Saw Caesar sail away.

And Circe scarce had more success:
When sailors came to dine
The magic food she offered them
Turned all her guests to swine;
And, grunting on the floor,
They did not ask for more.

From Edith, in another age,
These two have much to learn;
Her white-hot and superior
Infallible technique would turn
Queen and enchantress pale:
She keeps her men—with whale.

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Wrappers on Imported Meat

Supplies of boneless beef from the U.S.A. have been received wrapped in brown paper with an outer cover of stockinette. It has now been decided that a tare allowance of ¾ lb. shall be made in respect of packages of U.S.A. boneless beef wrapped in this way.

Oysters from France

Under arrangements similar to those made last year, an import of 200 tons of oysters from France will be permitted during the period from September 1 to December 31, 1947. Prospective importers should make application for an import licence to the Board of Trade, Import Licensing Department, 179-189, Regent Street, London, W.1.

Home-Grown Apples

It is announced that the price control of home-grown apples, removed at the beginning of August, will only be re-introduced if prices become unjustifiably high; some seasonable increase is, of course, justifiable. In such event the maximum prices will be on the same level as those operating in the corresponding periods of the 1946-1947 season.

Carbonated Soft Drinks

The Soft Drinks Order, 1946, is being amended to increase by 50 per cent. the prescribed sugar content of carbonated drinks such as lemonade, ginger beer, and ginger ale. This new arrangement came into operation for manufacturers from July 20, but wholesalers and retailers will be allowed until October 20 to dispose of stocks of carbonated drinks with the lower sugar content made before July 20.

Lemonade, orangeade, limeade, ginger beer, sparkling special, fruit cup, and appleade must contain 4·5 lb. of sugar and 50 grains of saccharin per 10 gallons. Ginger ale and quinine tonic water must contain 4·5 lb. of sugar and 25 grains of saccharin per 10 gallons.

No change has been made in the amounts of acid and fruit juice prescribed in the 1946 Order.

Information and Advice

Carob Gum

B.1951. *Information required regarding the treatment of the seed of the Carob tree in order to extract the gum and to pulverise it.* (London.)

The following is a selected bibliography of references on the preparation of Carob Gum from the Carob Bean (*Ceratonia siliqua*).

1. "Treatment of Seed of the Carob Tree or other Plant to Extract the Gum." *Soc. Anon. Etabl.* J. F. Audibert (E.P. 241,186). Abstracted in *British Chemical Abstracts*, B, 1926, p. 642.

It was proposed (*a*) to decorticate carob (or other) seeds by rolling and crushing, (*b*) to heat the endosperms to a golden-brown colour, (*c*) to stir them in twenty times their weight of boiling water, (*d*) to filter the viscous product and dry the gum in a hot-air apparatus, and (*e*) to grind the product.

2. "Manufacture of a Gluten-like Product." "*Tres.*" *Cyogyscer-Vegyesceti Ipari es Kereskedelmi R.T.* (B.P. 396,150). Abstracted in *British Chemical Abstracts*, B, 1933, p. 845.

The seed kernels, or separated endosperms thereof, of the group of *Mimosaceae* and *Caesalpiniaceae*, with or without treatment by dilute acids or bleaching agents, are treated by the usual methods for the production of gluten.

3. "Durable Pastes from the Endosperms of the Seeds of the Carob Tree, etc." *Tres. Chem.-Pharm. Industries and Handels* A.-G. (E.P. 409,549). Abstracted in *British Chemical Abstracts*, 1934, p. 406.

Silicofluoric acid or its salts is added to the decorticated or pulverised seeds, or their extracts, etc., of *Ceratonia siliqua*, etc., in the proportion of 0·1 to 2·0 pads per 1,000 of the solution ready for use. Not only is putrefaction and/or fermentation inhibited, but the colloidal ageing of the solutions or gels is retarded or entirely suppressed. In addition, the viscosity is increased and a bleaching effect is obtained.

4. "Dehusking Carob Beans." Calico Printers Association, Ltd., L. A. Lantz and W. Roman (E.P. 546,149). Abstracted in the *Journal of the Society of Dyers and Colourists*, November, 1942, Vol. 58, No. 11, p. 236.

The beans are treated with more than 80 per cent. of their weight of concentrated H_3PO_4 containing less than 5 per cent. water, at 40° to 90° C. for 2 to 10 hours. The carbonised husks are then readily washed away and the beans are thoroughly rinsed and dried. Finishes, sizes, printing thickeners, etc., made from the treated beans are free from the dark brown particles of husk present when the beans are merely ground and sieved to remove the husk.

5. "Locust Bean Gum," by C. F. Mason. *Chemical Industries*, January, 1944, Vol. 54, No. 1, pp. 66-67.

With regard to reducing the gum to powder form, the type of machine used apparently varies according to the properties of the particular batch of gum, such properties being affected by the origin of the gum. The names of manufacturers of disintegrators and mills were given.

Information Supplied

B.1850. *Manufacturers of crimpers and containers.* (York.)

B.1852. *Makers of machinery for roasting flakes.* (Cumberland.)

B.1854. *Manufacturers of plastic brine vats.* (Somerset.)

B.1861. *Recipes for ice cream, and manufacturers of the necessary plant.* (London.)

B.1862. *Literature dealing with marmalade manufacture.* (Herts.)

B.1863. *Information regarding the manufacture of potato crisps.* (Yorks.)

B.1865. *Manufacturers of machinery for setting up cartons ready for filling.* (New Zealand.)

B.1867. *Addresses of suppliers of glucose.* (Australia.)

B.1868. *Manufacturers of a machine which will top, tail, and peel onions ready for pickling.* (Lincs.)

B.1870. *Suppliers of mixing, blending, and sifting machines.* (Northumberland.)

B.1875. *Manufacturers of the "Revo" truck castors.* (Staffs.)

B.1877. *Address of firm manufacturing a machine for automatically counting and packing tablets.* (Lancs.)

B.1880. *Manufacturers of machinery for making spaghetti and macaroni.* (Lancs.)

B.1883. *Suppliers of specialised machinery for dealing with peanut butter and peanut roasting.* (S. Africa.)

B.1884. *Manufacturers of filling machinery.* (London.)

B.1885. *Literature dealing with the manufacture of starch and maltose, and the addresses of firms manufacturing the necessary plant.* (Greece.)

B.1886. *Suppliers of equipment for making waffles.* (Somerset.)

B.1888. *Manufacturers of plant for bone and leather glue and gelatin.* (London.)

Information Required

B.1937 and B.1966. *Manufacturers of machinery for the production of drinking straws, type of straw, source of supply, methods of sterilising, cutting, and wrapping.* (London and Newcastle.)

B.1947. *Literature dealing with the viscosity of molasses with varying degrees of temperature concentrations.* (Essex.)

B.1969. *Information regarding the manufacture of mineral licks for cattle and sheep in block form, suppliers of machinery for this blocking press, details of composition of such licks, more particularly concerning the waterproofing of the mixture.* (New Zealand.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2., price 1s. weekly (annual subscription £2 10s.).

Abstract of Recent Specification

A Method of Producing a Ready-to-Eat Cereal Product

In general the invention relates to a cooked, ready-to-eat cereal composition of the shredded, puffed, crumbled biscuit granule, and the like type breakfast food which is readily digestible, highly palatable and of pleasing taste, of high nutritive value, and particularly of high protein content, by combining two plant protein materials, one of which has a high starch but low protein content, and the other a high protein but low carbohydrate content, so as to complement each other, even though each alone has been found to be obnoxious to the occidental palate.

More specifically it relates to a highly palatable and nutritious ready-to-eat breakfast cereal composed of a combination of yellow corn and soya bean, "yellow corn" here referring to a variety of maize having a yellow grain.

The invention provides a novel combination of these two materials hitherto considered obnoxious and incompatible, in the form of a highly palatable product, wherein they are associated in what is believed to be a physical-chemical relationship as distinguished from the well-known principle of merely a mixture of a diluent with a dilute whereby the undesirable qualities of one or the other are partially masked.

There is provided a method of treating de-fatted soya bean particles and yellow corn particles which comprises cooking and toasting an admixture of said particles. The materials are best combined in what appears to be substantially stoichiometrical proportions, that is the most palatable product is formed when these materials are combined in the proportion of approximately three parts by weight of yellow corn to one part by weight of the soya bean material. However, in general, good products may be formed by combining from about 20 to about 30 per cent. by weight of the soya material with from about 80 to about 70 per cent. by weight yellow corn in the composite product.

If the materials are cooked together in the form of grits or relatively large particles they are subsequently subjected to masticating or compacting action, such as by shredding apparatus, to spread more uniformly mix, and cohere the components and to bring them not only into intimate physical association, but to enable the taking place of further chemical reaction, and to retain the intimate relationship throughout the subsequent process steps, such as heat drying, tempering and toasting. On the other hand, if the two components are first reduced to relatively small or fine particles and intimately admixed with each other and with water into the form of a dough and so cooked, no further mixing, mastication, shredding or the like is required, other than sizing or shaping, before final drying and toasting.

583,120. *Kellogg Company.*

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

585,583. SAITZEW, J.: Process and apparatus for the continuous crystallisation of sugar.

585,584. CHARLES INDUSTRIES PTY., LTD.: Low temperature cooling chambers in refrigerators.

585,586. FEAR, E. D.: Production of whey concentrates.

585,606. ARKLE, F. M., and MURRAY, E. G.: Cartons or boxes made from cardboard or the like.

585,663. AMBROSE, E. J., and McGILL, E. F. G.: Manufacture of vacuum seals.

585,799. TAUSSKY, I.: Manufacture of shortenings and food compositions produced therewith.

585,813. SKINNER, G. D.: Devices for delivering measured quantities of powdered material.

585,877. LIVSEY, D. M. (Sims, A. W.): Apparatus for mixing fluids.

585,898. AUTOMOTIVE PRODUCTS CO., LTD., RIBBESFORD CO., LTD., and THORNHILL, P. W.: Packing devices for fluid pressure apparatus.

585,902. CHLORIDE ELECTRICAL STORAGE CO., LTD. (Murphy, H. P.): Liquid level indicating device.

585,915. STANDARD TELEPHONES AND CABLES, LTD., and FOULKES, C. H.: Metal-to-glass seals particularly for vacuum tubes.

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

MAY FAIR.—644,173. Confectionery (not medicated). **The Mayfair Confectionery Co., Ltd.,** Mayfair Buildings, Low Row, Sunderland, County of Durham; Manufacturers.

SOL DE ESPANA.—645,233. Fresh citrus fruits. **Jose Navarro Moner,** General Tamayo 7, Almeria, Spain; Fruit Merchnt.

SABROSO.—646,453. Coffee and tea, all for export from the United Kingdom to, and sale in, Gibraltar. **B. Sacarello, Ltd.** (a company incorporated under the laws of Gibraltar), 55/57, Irish Town, Gibraltar; Merchants.

New Companies

Arnold W. Bell, Limited. (430770.) 5, Blandford Street, Sunderland. To carry on bus. of manufacturing sugar and other sweetmeat confectioners, etc. Nom. cap.: £3,500 in £1 shares. Dirs.: A. W. Bell, Mrs. G. Bell, Mrs. E. E. Gott, Miss G. D. Bell, and Miss O. O. Bell, all of Southill, 17, Durham Road, Middle Herrington; G. W. Wigglesworth, 20, Ferndene Crescent, Sunderland.

Pennine Preserves, Limited. (430807.) Gibfield Lane, Belper, Derbyshire. To carry on bus. of manufacturers of or dealers in pickles, sauces, etc. Nom. cap.: £4,000 in £1 shares. Dir.: W. H. Williams, Garden Bank, Derby Road, Duffield, Derby (proposed director).

Birmingham Wholesale Fish Merchants' Association, Limited. (434597.) 109, Colmore Row, Birmingham. Nom. cap.: £1,000 in £1 shares. Dirs.: W. Waters, 42, Broad Oaks Road, Solihull (1st pres.); N. W. Scott, 123, Woodlands Road, Birmingham 11 (1st vice-pres.); C. E. Miles, Stones House, Stones Park Road, Solihull.

Purex Preserving Company, Limited. (434653.) 9, Park Place, Cardiff. To carry on bus. of canners and bottlers of pickles, spices, extracts, essences, etc. Nom. cap.: £3,000 in £1 shares. Dirs.: J. Irving Powell, 52, Merches Gardens, Grangetown, Cardiff; B. Edwards, The Anchorage, Western Avenue, Cardiff.

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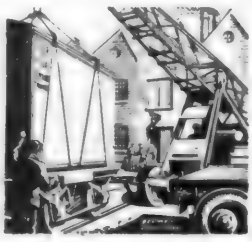

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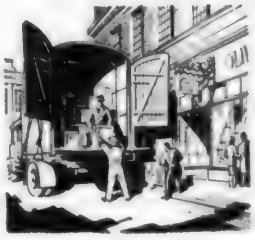

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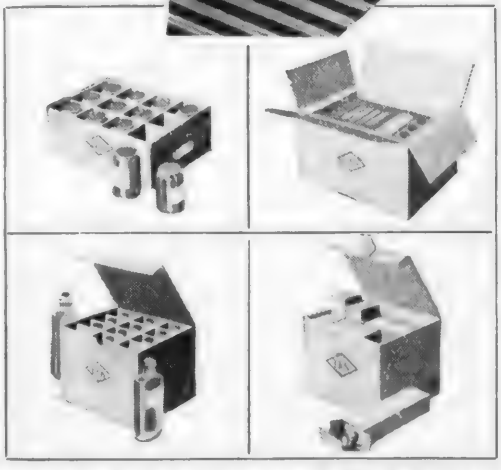

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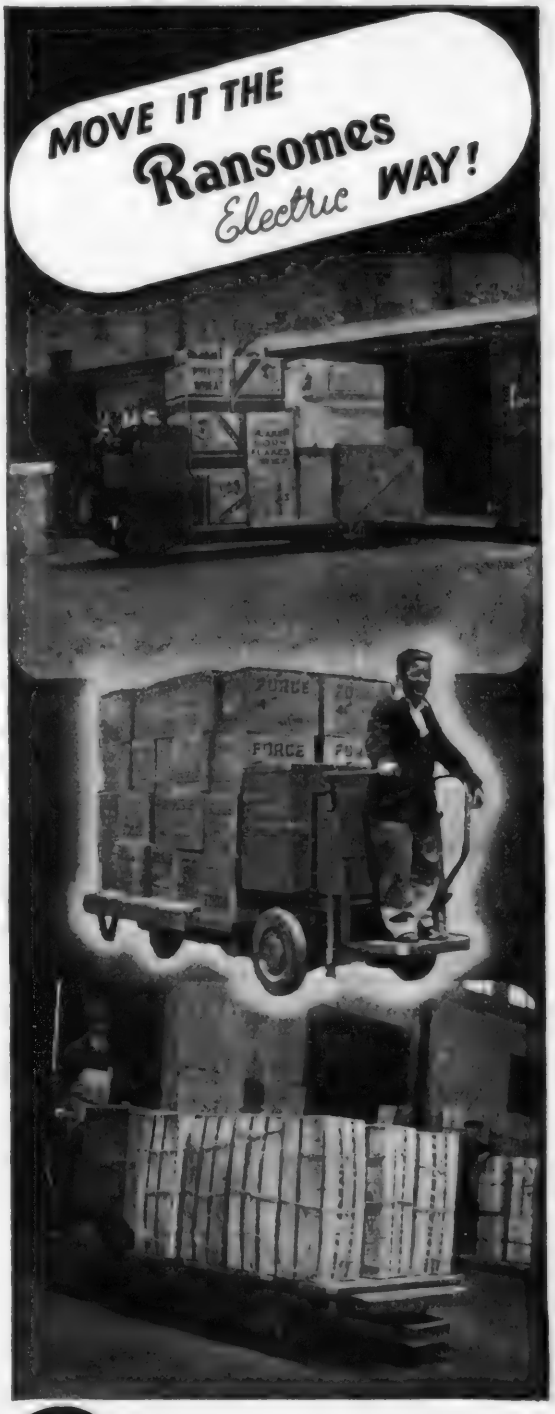

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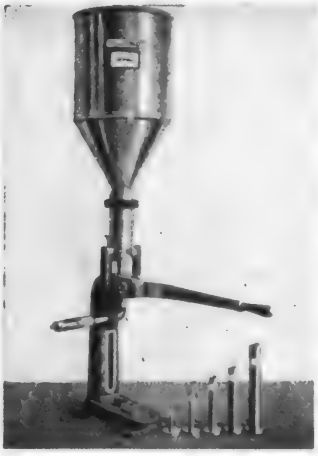

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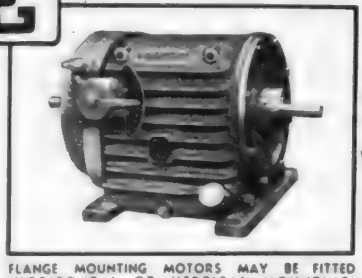

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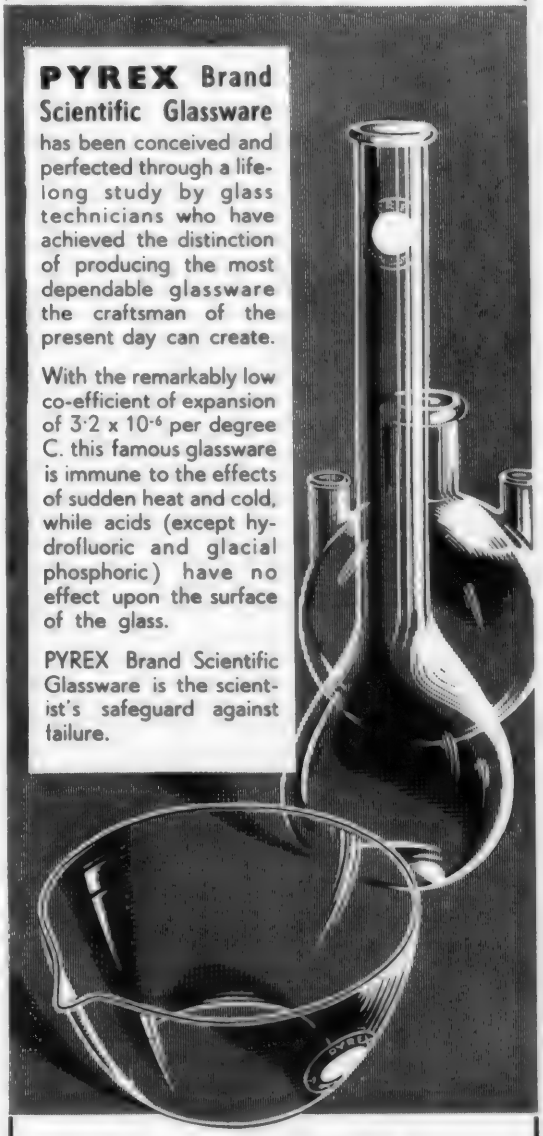

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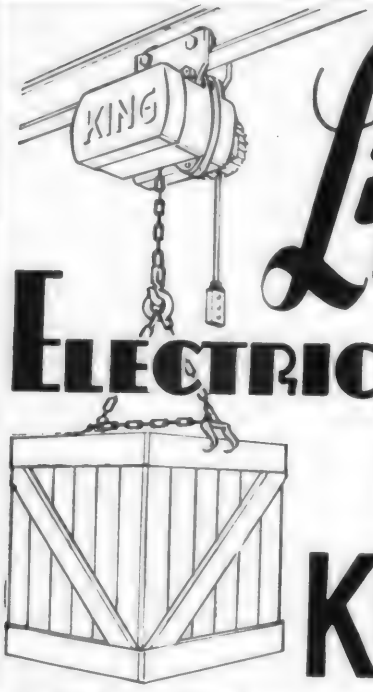

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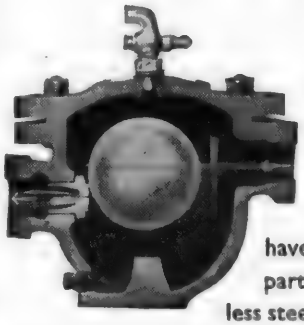

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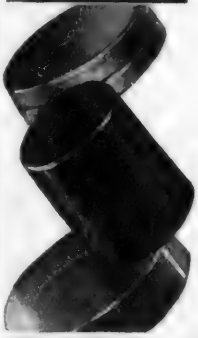

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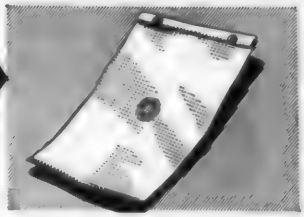

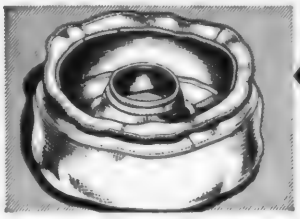

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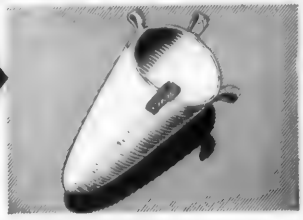

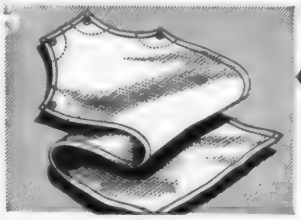

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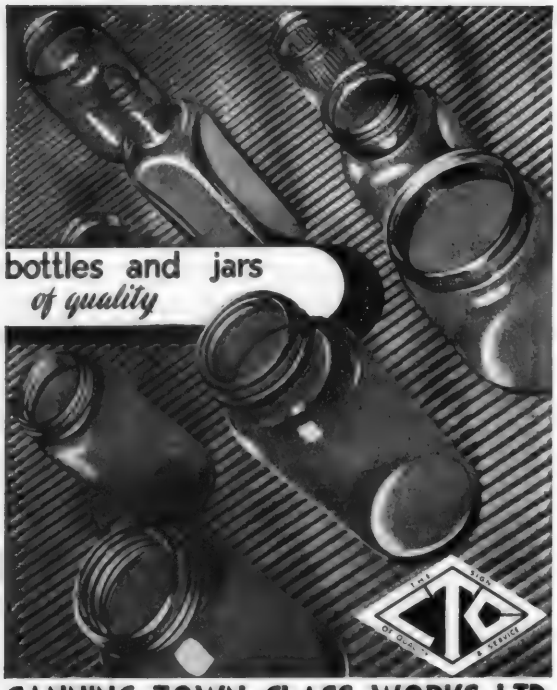

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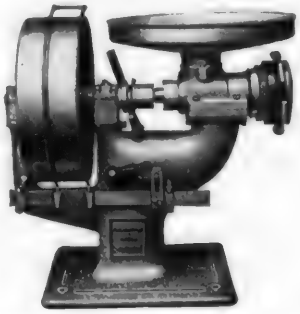

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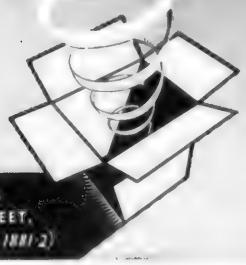

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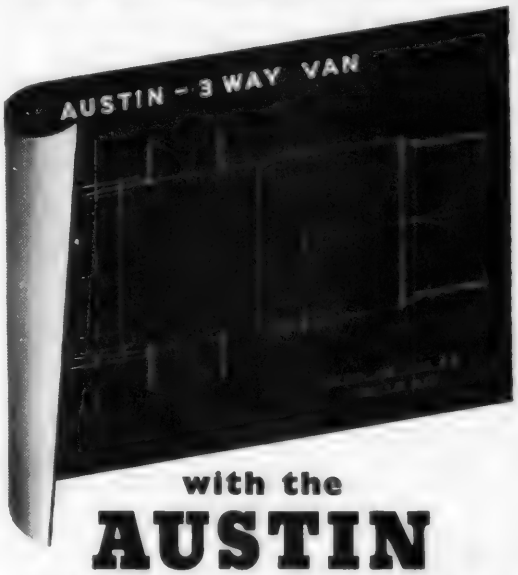

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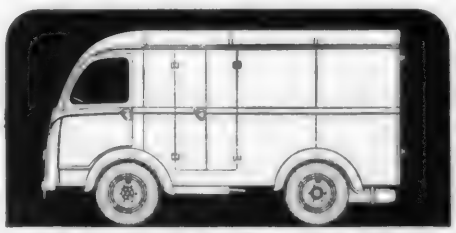

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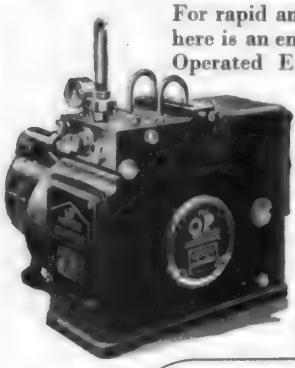

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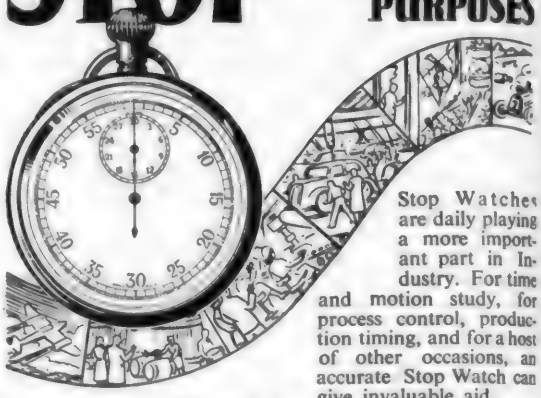

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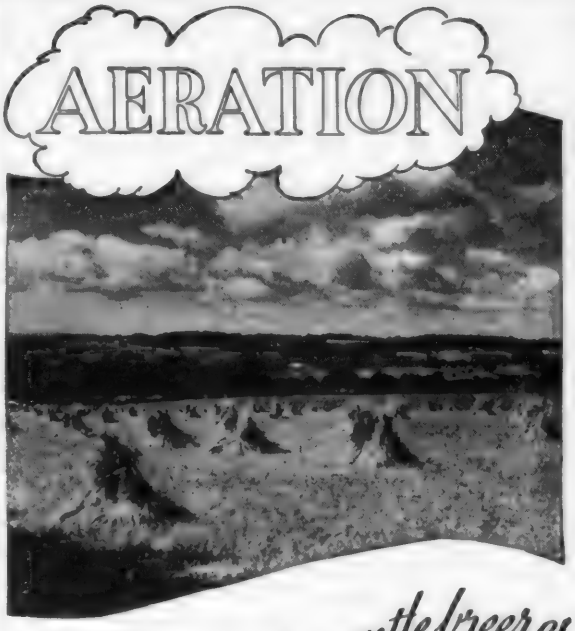

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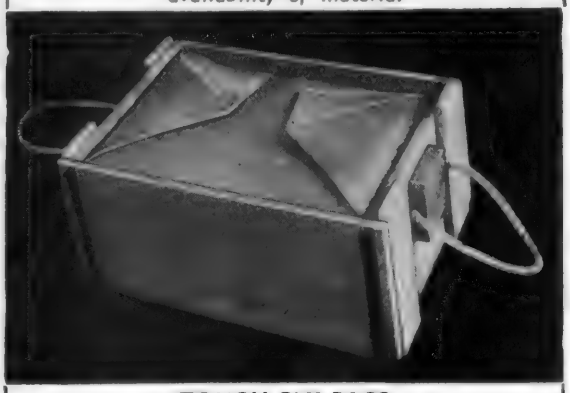

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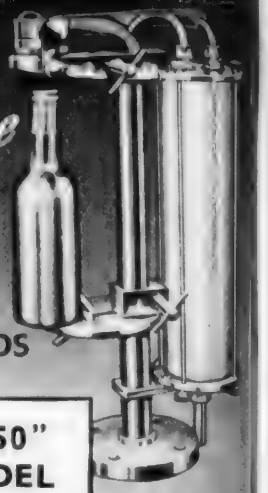

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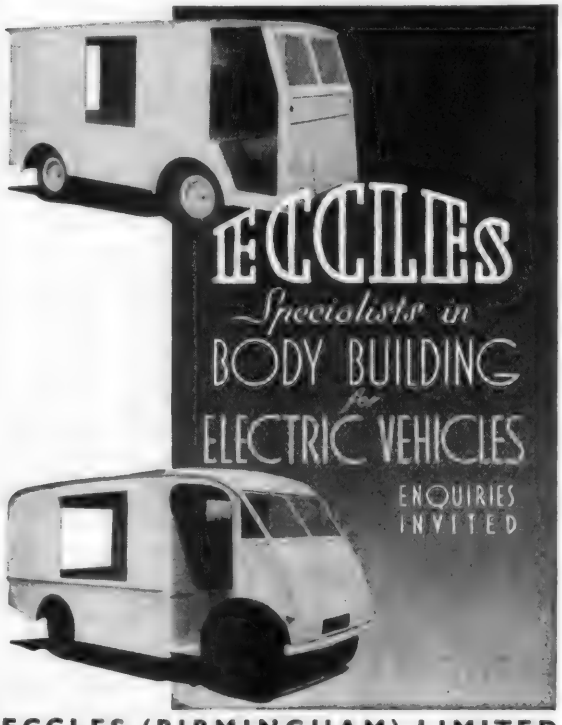

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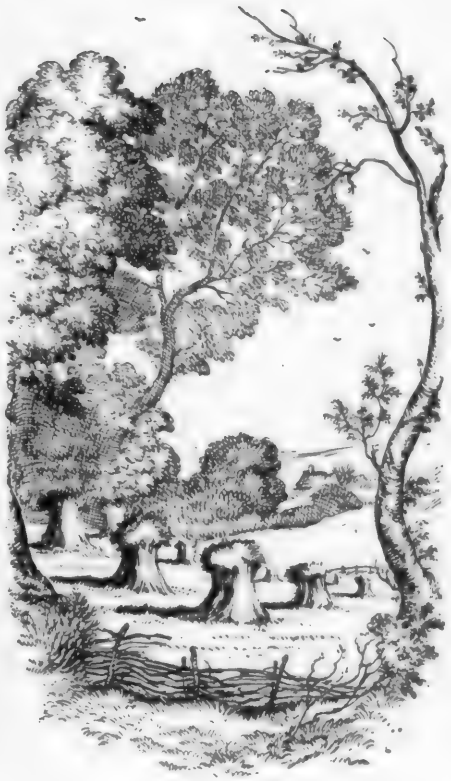

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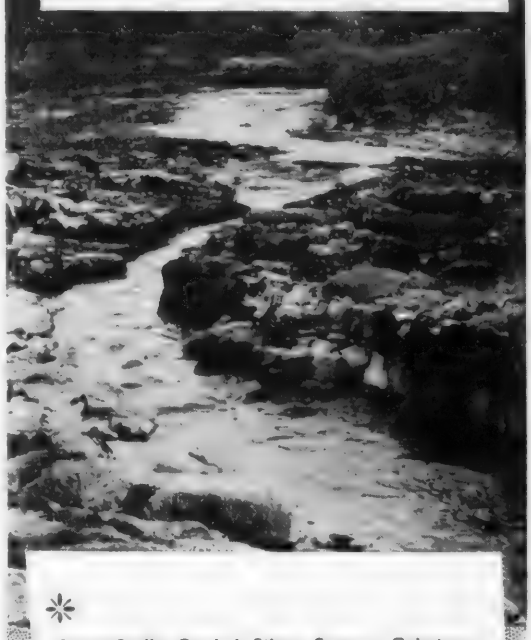

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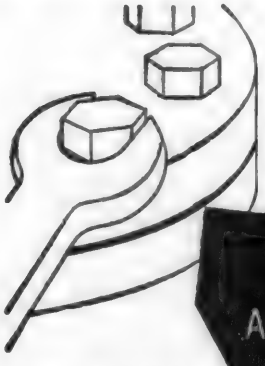

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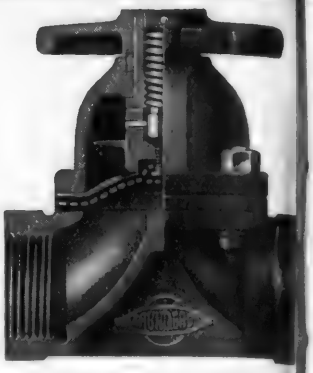

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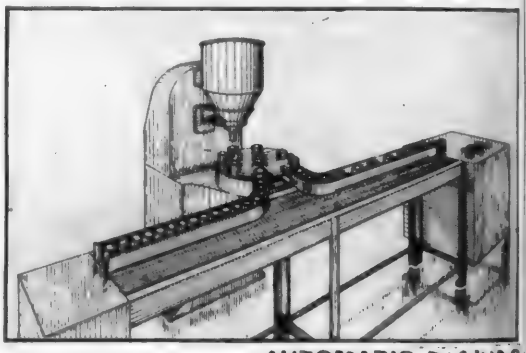

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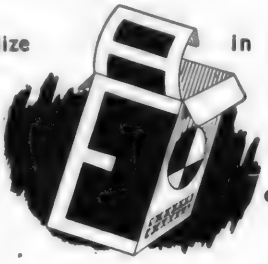

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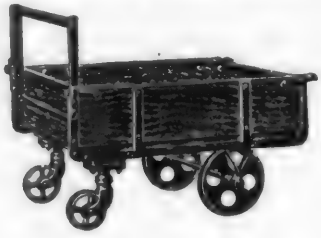

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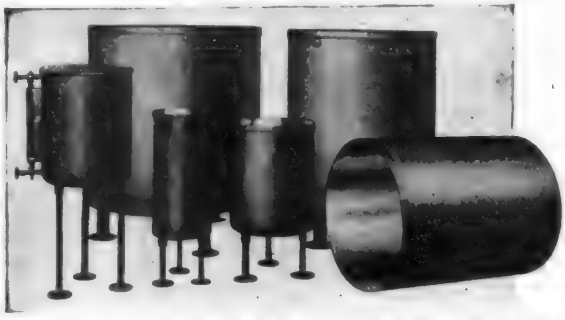

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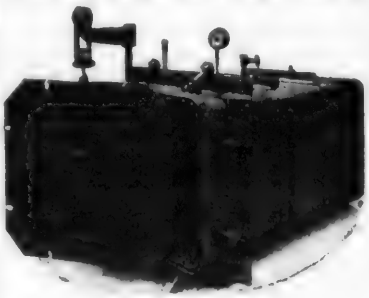

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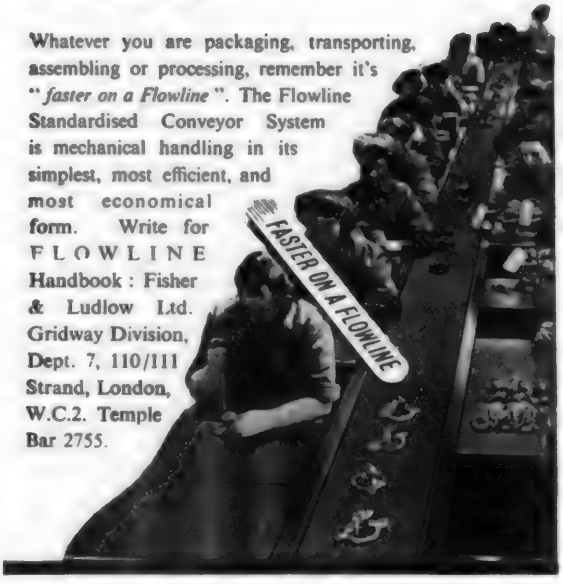

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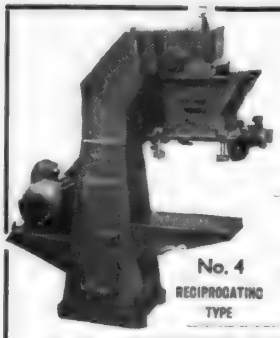

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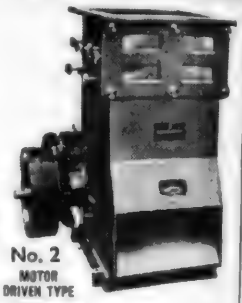

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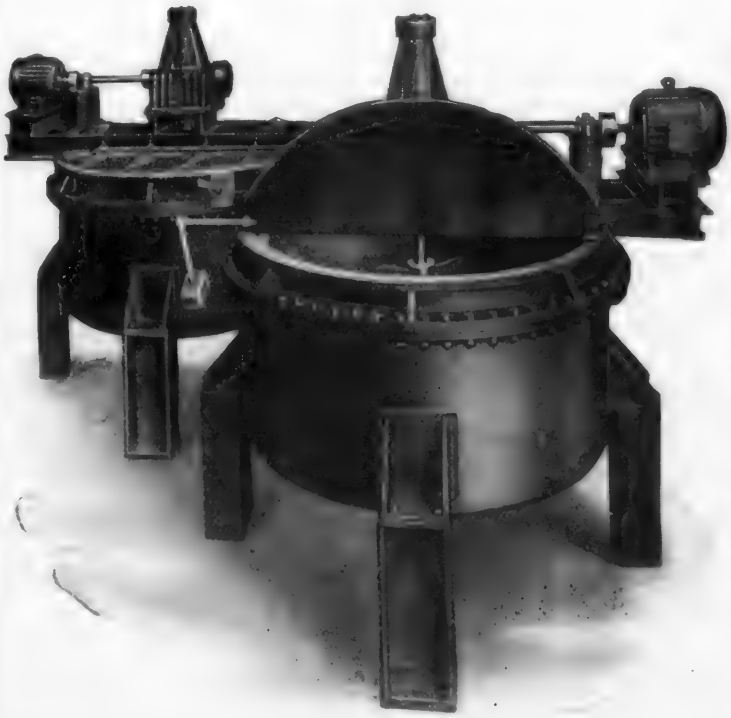

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Replies to BOX Numbers should be addressed to

Food Manufacture, 17, Stratford Place, W.1

SITUATIONS VACANT

FOOD Manufacturers, established over century, require Manager fully experienced modern processes, capable of controlling Factory, developing and extending range of products presently including Custard Powder, Blancmange Powder, Baking and Golden Raising Powder, Lemonade Powder manufacture, Cereals and Spice pre-packing. Good prospects to applicant who can produce results under Managing Director.—Applications in strict confidence giving full details and salary required to Managing Director, Box B1674.

EXPERIENCED and well-qualified Chemist for responsible position in a central research and experimental laboratory. Keen interest and adaptability to work in the cereal, fats, and associated products field and to apply chemical and physical knowledge. Exceptional opportunity. A suitable date can be arranged.—Apply Research Director, Weston Biscuit Company, Trading Estate, Slough.

SPLENDID OPPORTUNITY exists in a modern food factory for a male or female cook with imagination and creative abilities; one possessing domestic science qualifications and practical experience desirable.—Reply in confidence to Box 1727.

SITUATIONS WANTED

SALES Manager with extensive successful experience in all detail work connected with National or Area Sales campaigns, now at liberty wishes to contact firm desiring a capable, reliable man for Home or Export Sales.—Write Box 1705.

TECHNICAL or Production Manager (33) B.Sc., A.R.I.C., with wide experience of the manufacture of: Canned goods, Pickles, Sauces, Mayonnaise, Preserves, Table Jellies, Synthetic Cream, Macaroni and powdered Grocery lines, seeks change of employment where experience and initiative are required.—Box 1711.

MAN 43. Manufacturing: Control. Baker's Sundries, Essences, Compounds, Bakery Products, or accept position Preserves-Canning Factory. Certificate Technology. Disengaged. —Box 1715.

ENGINEER, 35, A.M.Inst.R., 6 years Govt. Cold Storage Research. Six war years commissioned R.E. and R.E.M.E., 2 years fruit and vegetable quick freezing and canning. Now assistant manager. Desires change.—Box 1721.

WORKS Manager, expert cooked meats, soup and meat canning, bacon smoking, etc. Well educated, energetic, sound technical background. Ability to take full control of factory. Desires change.—Box B1691.

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PASTEURISER, 24 in. dia. by 2 ft. 6 in. deep, with detachable cover, agitating gear and fittings.

Cast-iron Jet Condenser by Lurgi, 9 ft. on straight, flanged bottom run-off, 2 ft. 3½ in. liquid connections.

Steam-heated Drying Oven by Bakelite, 4 ft. 6 in. by 2 ft. by 5 ft.

Horizontal enclosed drum-type steam-jacketed Mixer, 3 ft. 9 in. dia. by 8 ft. long, heavy-type paddles on glanded shaft driven from pulleys through worm gearing, 2½ in. dia. bottom run-off.

Two horizontal cylindrical T.E. steam-jacketed Mixers or Fat Melters, 6 ft. long by 3 ft. 9 in. dia., of riveted construction, ⅜ in. plate, jacket ½ in. plate jacketed for three-quarters of circumference.

Fitted fin-type blade agitator on shaft 2½ in. dia. carried in glanded bearings. Shaft extension fitted with m/c bevel gear, 21 in. dia., and supported by outer bearing mounted on bracket integral with shell. Vessel fitted with manhole, 21 in. dia., with swing lid, secured with swing bolts, also manhole 11½ in. dia.

Horizontal unjacketed open top belt-driven Mixer, having mixing pan 2 ft. 7 in. by 2 ft. 1 in. by 2 ft. 2 in. deep, with two sets of scraper type blades driven through one stage of spur gearing from fast and loose pulleys 16 in. dia. by 2½ in. face, with belt striking gear; mounted on cast-iron side frames.

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REDUCTION Geared Electric Motors, all sizes in stock, also comprehensive stock of all Motors stocked.—Universal Electrical Co., 221, City Road, London, E.C.1. Enquiries invited.

FOOD Manufacturers with highly efficient Sales Organisation are interested in Imports of High-Grade Food Stuffs specialities suitable for Grocery, Bakery and Catering Trades. Sole Agencies preferred. Lines manufactured in the U.K. considered.—Full details to Box 1702.

PRODUCTION troubles? Seasonal Peaks? Write to Box 1714. We can assist in the manufacture and packing of all types of household products, including the provision of packing materials. Factory in Home Counties.

JAMS and Preserves. An opportunity is offered to acquire a sound West of England business with good factory and modern equipment, and ample room for expansion. Present turnover £40,000-£50,000. Can be trebled on present site. Principals only are invited to apply to: Box 32, Smiths Library, Sidmouth.

SWEDISH Factory with first-class technical management and staff of employees, and with a sales organisation covering the whole of Sweden, equipped with among othert hings, new and quite modern machines for vacuum evaporation, spray-drying and spray-crystallisation, wants to undertake the manufacture on contract for or open co-operation with British undertaking in the provisions or chemical line. Best references are given and a first-class work in every respect can be guaranteed. An agreement could, if wanted, comprise manufacture and selling for the whole of Scandinavia.—Reply to 'Loyalty—Efficiency," c/ o, Gumælius Advertsing Agency, Stockholm, Sweden.

THE Trade Mark ZEROONA (No. 205638) registered in Class 42 in respect of substances used as food or as ingredients in food was assigned on May 13, 1947, by Grimbly Hughes & Co. Ltd., 56, Cornmarket Street, Oxford, to The Korebo Delicacy Co. Ltd., of 55-57, Cornmarket Street, Oxford, *without the goodwill* of the business in which it was then in use.

LONDON Wholesale Distributors, having large warehouse and prepacking facilities, with extensive sales organisation covering the whole of the United Kingdom and own sales staff, seek sole distribution of lines suitable for grocery and allied trades. Would be willing to take over complete output, and financial assistance given, if necessary. London and Provincial Manufacturers interested in extending their trade and securing markets for the future, please communicate to Box B1668.

MARTIN, Wood, Son & Partners (Industrial Surveyors and Valuers) urgently require for clients, food factories and warehouse depots, Mid-West counties.—Reply to 81, High Holborn, W.C.1 (Tel.: Hol. 4485 and 6077).

NEW and spacious premises available to manufacturers requiring wholesale representation in Birmingham. Supplying the Catering Trade, Bread and Confectionery Trade, Works Canteens, etc.—Box B1648.

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MACHINERY INSPECTIONS AND APPRAISALS.

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Please ask for references.

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BUSINESS OPPORTUNITIES

DUTCH Manufacturers' Representatives in foodstuff specialities desire to contact purchasers United Kingdom and other countries. — Write to ROB N.V., Janskerkhof 15, Utrecht, Holland.

WELL-KNOWN South African manufacturers of high quality jelly crystals, custard and pudding powders, fruit drink crystals, cake mixtures, etc., with selling organisation extending throughout the Union of South Africa and connections in East and West Africa, Kenya, India, Egypt, etc., are interested in the handling of other proprietary brands of dry packed grocery lines, *e.g.*, invalid and baby foods. Would consider manufacture and/or distribution under their own or another name.—Write full particulars to Managing Director, P.O. Box 31, Huguenot, Cape, South Africa.

NATION-wide sales organisation with remarkable record of successful merchandising is open to consider one or two new lines. Only branded lines offering possibilities of big permanent business are of interest.—Box 553, c/o Erwoods Ltd., 211, Piccadilly, London, W.1.

MANUFACTURING Plant. Capacity available for all types of plant and equipment. Prompt attention to enquiries.—Box B1291.

SHOT Blasting, Metal and Paint Spraying: We are able to undertake the efficient and prompt handling of all goods sent for treatment. Large capacity available. Enquiries to Commercial Structures Ltd., Staffa Wks., Staffa Rd., E. 10.

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Large Food Products Concern in Eire, with excellent manufacturing facilities and a selling organisation covering the 26 counties, are interested in manufacturing, prepacking, and / or distributing the retail lines of a reputable cross-channel firm; interested parties should write, in first instance, to Box 1726.

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SECOND-HAND PLANT WANTED

WANTED Cross Tube Boiler, about 10 ft. by 4 ft. 6 in.; also two Steamjacketed Copper Pans, about 45 gals. capacity; Fruit Pulping Machine; Juice Pressing Machine; Copper Cooling Pan, or would buy contents of small factory. State full particulars and price.—Write Box 1703.

WANTED, Emulsifier, Vertical Mixers, 5 ft. Malangears.—Write Box 1708.

WANTED. Modern type rotary film dryer and/or spray dryer in stainless steel.—Please write and forward particulars.—Box 1706.

WANTED, Hursting Mill with under runner fitted with 3-ft. french burr stones.—Box 1707.

LARGE Bowl Chopper, Power Sausage Filler Buffalo or similar Mixer and Copper or Stainless Steam Pans.—Box 1719.

WANTED immediately: Steam Boilers of all descriptions, suitable for 80-lb. working pressure or over. Boilers requiring repairs not objected to. Horizontal Crude Oil Engines, 15 to 200 h.p. Good prices paid as and where lying, and prompt removal arranged.—Fred Watkins, Coleford, Glos.

SPRAY or film dryer, moderate capacity, wanted urgently.—Box 1725.

POTATO Peeler and Potato crisping machine required. Belt drive or motor driven. Must be in first-rate condition.—Replies to Box 1722.

MISCELLANEOUS WANTS

FOOD manufacturing business wanted as going concern.—Give fullest information to Box 1710.

SWETS and Zeitlinger, Booksellers, Keizersgracht 471, Amsterdam, wants to purchase *Food Manufacture*, 1940-45, 1946, Nos. 1-2, and asks owners, who might be able to sell, to communicate with them.

SIX Round Metal Bins—new or used—to hold 2 to 5 tons flour. With or without discharging equipment.—Box B1694.

WANTED, unlimited quantities of Oak and Softwood Casks suitable for holding fruit pulp. 40-gall. capacity preferred.—Box B1564.

SUPPLIES of 6oz. and 8-oz. Chutney and Sweet Pickle bottles required, large or small quantities, with or without caps, must be new. Would consider long-term contract.—W. E. Smith (M.P.), Ltd. (proprietors of well-known Baldwick brand Sweet Chutney and Jubilee brand Sweet Pickle), Thorneywood, Notts.

RECONSTRUCTION will necessitate considerable capital outlay. Our hire purchase facilities—available for every type of plant—conserve capital now for the needs of the future.—MERCANTILE CREDIT COMPANY LIMITED, Argyll House, 246/250, Regent Street, London, W.1.

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POWER Conveyor, 72 ft. long to take belt 12 in. wide, complete with all gearing and 1 h.p. 3-phase 400-440 volt Motor, no belt. Price £150.—Hiller, Dunnington Heath Farm, Alcester.

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STAINLESS Steel Mixer 3 ft. diameter by 9 in. wide. 460-ft. Slat Conveyor 15 in. wide. Jacketed Vacuum Tipping Mixer 19 in. by 19 in. by 16 in. Steam Heated Canteen Oven 6 ft. long. Jacketed Copper Tipping Pan 20 gals. Jacketed Steel Tank 5 ft. by 4 ft. by 4 ft. Ammonia Refrigerating Plant 2 tons Capacity.—Harry H. Gardam & Co. Ltd., Staines.

MINCER, Large Alexander Belt-Driven type' Fast and loose pulley. Excellent condition' also Alexander 35-lb. Bowl Cutter, belt driven. Perfect condition.—James & Co. (Darlington), Ltd., Avenue F., Aycliffe Trading Estate, Darlington. Aycliffe 2178.

IWEL Universal Bone Crusher. Mohle D5 Electric Mincer ½-ton capacity, 4½-in. plates, Peerless 30-lb. Oil-electric Sausage Filler, 120-lb. Pneumatic Sausage Filler, Hand-operated Sausage Fillers, Vacuum Double Seamer, Vacuum Soldering Machine, Several Jacketed Mixers, 80-gal. Steam Pan, 5-ft. Vertical Boiler.—Albert E. Maiden Ltd., 46, Fenwick Street, Liverpool 2. Tel.: Central 0314.

IGOOD secondhand Jackson Crockatt Major Powder filling machine, complete with A.C. Motor and starter.—Box 1724.

LEHMANN 16 in. Chocolate Enrober, 50 ft. tunnel cooler; Savey, Jean & Cover, all 16 in. Enrobers; Lehmann Triple Cocoa Mill; Lehmann 2-cwt. Open Fired Roaster; Baker 3-roll Steel Vertical Refiner, 33 in. by 19 in.; Chocolate Paste Mixer, heavy-duty; 350 lb. Chocolate Kettles; 3-roll Horizontal Granite Refiner, 16 in. by 9 in.; Reiche Chocolate Drop Press; 700-gall. Glucose Tank, enclosed with pipes and valves; Steam Coil Drying Oven, interior 6 ft. by 3 ft. 6 in. by 5 ft.; Rose Caramel Cut and Wrap Machines; Rose Twist Wrappers; Rose Fold Wrappers; Carton Fold Wrappers for heat-sealing with cellophane; new Can Labelling Machines; new Vicars top 20 in. Anvil Stitcher; Power Cardboard Bender 41 in.; Hand-Shearing Machine 30 in.; Power Box Nailer; Paper Baling Press; Electric Dough, Caramel and Lozenge Brakes; Caramel Cutters; Tandem, fully automatic; Starch Travs; Nougat Cutter; Jap Guillotine Cutters; B.C.H. Crystallizing plant; Silke Reel Centrifugal Sifter; Vertical Bucket Elevators; Turner Vertical Double-Roll Cereal Mill.—E. W. Wallbridge. 136, Sefton Street, Southport. Tel.: 5428. Telegrams & Cable: Wallbridge, Southport.

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FOR Sale: Unused flat top bogie trolleys, 5ft. by 3ft. by 16in. high, oak tops and bearers iron wheels 11 in. dia. by 2 in. wide, front wheels swivel, with 36 in. "T" type draw-bar, £7 10s. each. With 12-in. dia. solid rubber-tyred wheels, £10 each. Delivered. Cash with order.—Reed Brothers (Engineering), Ltd., Cuba St., London, E.14.

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AVAILABLE in minimum 25 gross lots, 550 gross Imperial Pint White Flint screw neck bottles. Immediate delivery.—Box 1700.

FOR Sale, Large number of Wooden Jam Crates to hold 2 dozen 1-lb. Jars or 1 dozen 2-lb. Jars.—Box 1701.

BOTTLES and Jars for sale for immediate delivery by Manufacturers from stock. ½-oz. to 10-oz., with narrow and wide necks, Metal and Plastic Caps.—Poplar Glassworks Ltd., 40, Sackville Street, London, W.1. Telephone: Regent 7200.

LARGE Numbers of Tinned Steel Drums 80-90 gals. with Bungs once used for Edible Oil. Good Clean Condition. 40s. each or 30s. each for taking lot. Also Large Numbers Steel Munition Boxes about half cost of Cardboard Cartons—suitable for outers for canned goods—Bottles, etc.—Pattison, Siddals, Derby. Tel.: 45249.

CROYDON. Cnr. Grd. Flr. Factory Bldg. for immediate occupation, approx. 27,000 sq. ft. Rent £4,000 p.a.—Box 1712.

ALL guaranteed brand new 3/·029 Twin Flat Electric Cable, braided and compounded. 250 volt. Best make, both V.I.R. and P.V.C. Special sample offer £2 per 100 yards C.W.O. Trade supplied. Indispensable in garages, workshops, foundries, farms and everywhere where electricity is used. Large discounts for quantities. Also large stocks of Aeroplane, Automobile, Flexibles, Ignition, Lighting, Multicore, Radio, Screened, Starter cables at exceptionally keen prices. Write for list and give details of requirements, to Box 2159, G.T.C, 82-94, Seymour Place, London, W.1. Paddington 3456.

FACTORY for Sale. Vacant possession, South London, Ground Floor factory premises, area 7,500 sq. ft., all services, heating, Low Price for freehold.—Apply Allan Phillips & Co., Surveyors, 46-7, Chancery Lane, W.C.2. Tel.: Hol. 1753 and 4892.

GLYCERYL Mono Stearate, Food Quality. Lactose, Food Quality. Malt Extract. Reasonable quantities offered.—Write Box 1723.

IF you need plant—new or reconditioned—and require your capital for other things, we can finance the purchase for you. Enquire without obligation.—MERCANTILE CREDIT COMPANY LIMITED, Argyll House, 246/250, Regent Street, London, W.1.

Distillers and manufacturers of

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RUBBER Rings (natural rubber) suitable for various Food Preserving for sale.—Apply Rubber Dept. of Ch. Goldrei, Foucard & Son, Ltd., 63/69, Llewellyn Street, S.E.16.

GLYCERYL Mono Fatty Acid and Glyceryl Dioleates: Food and Drug quality, for actual users only. Available in limited quantities.—Box B1680.

MASSEELEY Showcard machines (rebuilt), Types, Dies, Ornaments, Roll Feed Foils, Cardboard, Gummed Papers, Repetition Manilla, Metal Pins and Struts, also Types and Dies to Order.—Write Hill Bros. (Service) Ltd., Red Lion Corner, Harlington, Middlesex. (Tel.: Hayes 1414.)

FRESH wholesome fish napes, suitable for use as base for Fish Pastes, etc., 24s. per cwt., carriage paid.—Fred Smith, Fish Curer, Albion Street, Grimsby.

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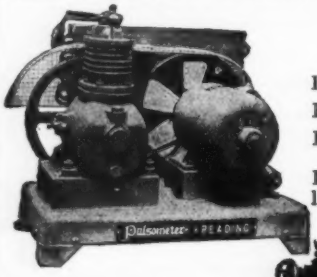

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Where steam traps are concerned, reliability is worth a ton of theory. Trapping theory is wasting the paper it is on if it is not backed up with a dependable trap. Traps that need frequent renewals and maintenance if they are to function properly are throwing money away.

Every Drayton-Armstrong is guaranteed for two years against servicing and renewals. Thousands are doing their job as good as when they were new which have been in use for years . . . many up to 12 years.

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Free-floating, wear-proof lever action.

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